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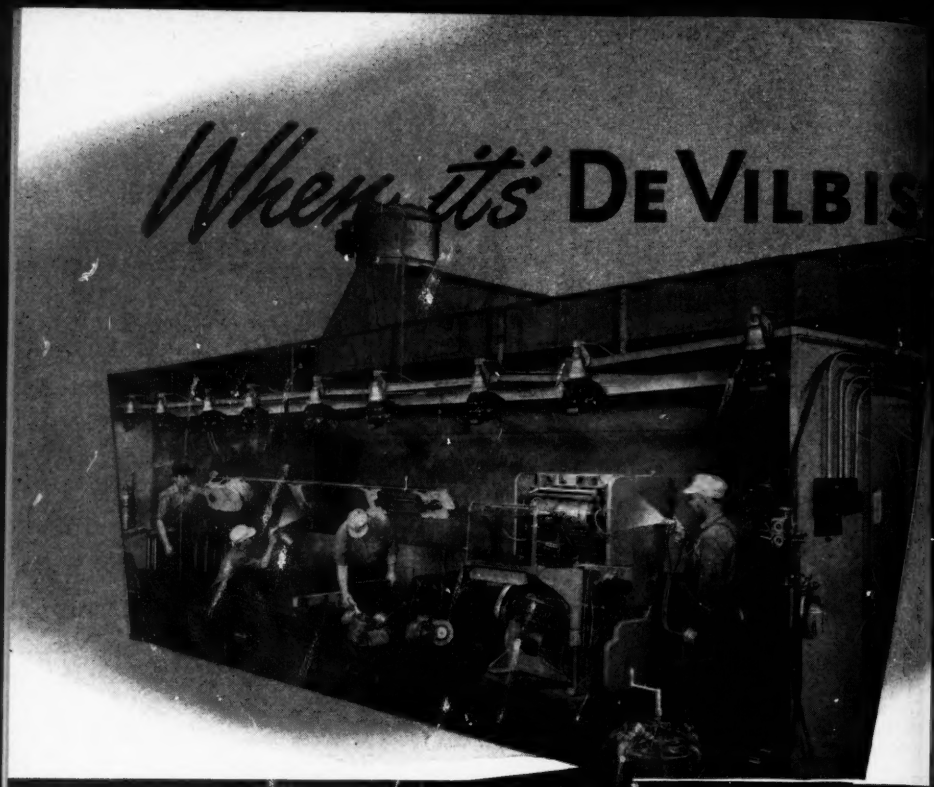


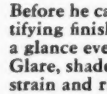
DEVILBISS HINTS ON FINER FINISHING

SPRAY BOOTH LIGHTING

Adequate, efficient illumination is a basic essential wherever spray painting is done. "Shooting in the dark" is certain to reduce the efficiency of even the best operator even though he might otherwise be equipped with the best spray facilities.

Before he can apply a uniform protective or beautifying finish, the operator must be able to see at a glance every detail of the surface he is to finish. Glare, shadows, and dim light not only causes eye strain and rapid fatigue but more important still, slows up the rate of production and hinders good quality work.

In most cases, the evenly distributed, softly-diffused light of properly mounted approved types of fluorescent lamps will provide the abundant glareless, shadow-free illumination that is ideal. Nevertheless very satisfactory results are also to be had from incandescent type fixtures of the proper number, type, size and location. Whatever the type light used, the fixtures should always be an approved dust-tight type.



Even the best lights will not provide efficient illumination for very long, however, unless they are kept clean and free of overspray depos
If fixtures, designed for spray booth light
are used, cleaning will be a simple job. T
sealed glass front keeps overspray from rea
ing the reflectors, hence all that is necessar
to clean off the overspray that accumulates
the outer glass lens itself. Such cleani
should always be done with t
lights off, however.

Incidentally, the sealed, dust-ti
fixtures provide several added
tures by protecting the lamp bu
or tubes from being broken
reducing hazards of sparks and hot lamp bul

The lighting efficiency of any spray booth will
further improved by using light colors on
interior surfaces of the booth. If a spray shield
material is used, it should be light in co
and should be renewed as often as it becom
sufficiently covered with overspray to dar
the booth.

Everything that is done to "lighten" the work
the spray booth will definitely be "reflected"
a finer finish on the product.

pf editorial

AUGUST, 1949

Vol. 13, No. 11

Air Keep Your Powder Dry

The injunction "Keep Your Powder Dry", long a watchword in the early days of our Country, might well be paraphrased to read "Keep Your Air Dry", and serve as a word of advice to plant engineers, master mechanics, process engineers and all others responsible for the production of clean, dry air for the finishing department.

All finishing supervisors know that the summer months, by reason of the fact that the moisture content of the outside air is higher during that period, constitute a period when spraying defects increase. Many a supervisor, as he views the approach of this season, hopes that the long-promised after-cooler, spare or replacement air compressor, and other necessary equipment will be delivered and installed in time so that he will have fewer rejects and less trouble than during the preceding summer.

Each supervisor of a paint finishing department or a porcelain enameling operation is likewise familiar with the defects in the finished product caused by moisture or oil, or both, in the air used for spraying. Also, air-operated sanders and other high-speed power tools have actually frozen solid as a result of water in air lines.

As plants expand, or production requirements increase, the addition of more air-operated tools, or more spray outlets to a plant's air system is a much different matter than plugging an electrically-operated tool into a socket and power line, which was *designed originally* for certain overload conditions. Because of the expense of air compressing and handling equipment, it is usually not practical to provide for a much greater capacity than that which will be needed in the foreseeable future.

Some of the items of equipment needed to provide finishers with clean, dry, air are discussed in Mr. Wampler's article "Clean Air for Spray Equipment," beginning on page 28 of this issue of *PRODUCTS FINISHING.* This additional comment is made to emphasize the overall picture and the wide scope of the problem.

This is a problem which can be solved satisfactorily only by coordinating the effort of each plant's engineering staff and that of the technical and service staff of each air handling equipment and spray equipment manufacturer. In the solution of this problem in each finishing department, these equipment manufacturers, through their technical and service representatives, can offer counsel of great value.

E. A. Blount

By ROBERT I. SHORE

PF FEATURE

Since 1870, The D. L. Auld Company, Columbus, Ohio, has been in continuous operation, one division being presently engaged in the manufacture of drawn, formed, and embossed metal parts for the automotive, refrigerator, radio, stove, and other industries, wherein distinctive identification of the manufacturer's name is placed before prospective purchasers. In addition to script and semi-script plates, the company is accredited as being one of the largest manufacturers of cloisonne enamel name plates, medallions and emblems, embracing the use of bronze, with vitreous enamel being applied by firing at a temperature of around 1,400 deg. F. The company is also well equipped to apply baking enamels of various color shades which add contrast to highly polished and plated surfaces. The metal can be finished in silver, nickel, chromium, or gold plate, or in natural bronze, aluminum, or stainless steel.

The various products manufactured by the company may be considered to fall into several groups from the standpoint of processing. Some emblems are stamped from stainless steel and finished by a combination of polishing and spray painting. Other products, stamped either from steel or brass, are plated with various metals and sprayed with baking lacquer of various colors. Revere metal parts are stamped, pickled, painted for contrast, or coated with clear baking varnish to preserve the color of the base metal. Bronze name plates, after blanking and coining, are decorated with fused-in vitreous enamel, after which the emblems are polished and electroplated.

This article describes the principal unit operations performed in the man-

ufacture of some of the metal name plates and emblems. For bronze parts, the steps described in the following paragraphs are followed.

After blanking, the plates are embossed in presses of the type illustrated in Fig. 1, using dies operated at pressures of from 400 to 800 tons. The coined parts are then bright dipped in a solution containing two parts sulfuric acid and one part nitric acid. (Where parts are made of Revere metal, they are first dipped in a boiling solution containing 10 oz./gal. caustic soda, rinsed, and then bright dipped.)

Following the bright dipping operation and after rinsing and drying, lugs are soldered on the name plates and emblems, as shown in Fig. 2. Next, vitreous enamel is sifted, either by hand or mechanically, into designated indentations in the parts and fired at a temperature of approximately 1400 deg. F. in a continuous furnace. For

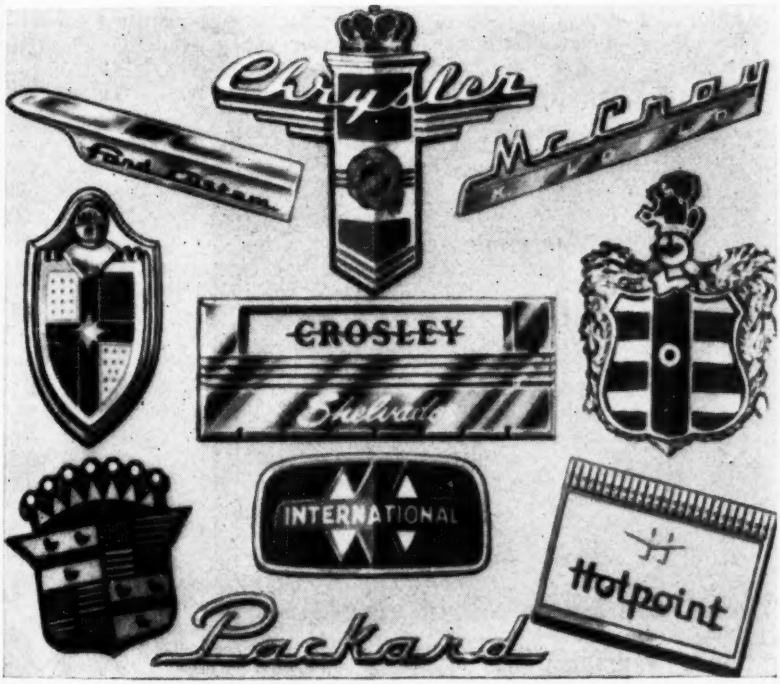


Fig. 2—This illustration shows operator soldering lugs to a bright dipped name plate.

each additional color to be applied, the parts are pickled to remove the scale resulting from the preceding firing operation and then filled with vitreous enamel which is subsequently fired. The vitreous enamel used is purchased ground to the desired fineness and is sifted into the parts dry.

The vitreous enameled parts are next rough ground using a 120 emery solid wheel. Any chipping of the enamel incurred during the rough grinding of the parts is patched with moistened paste (ground enamel and water), as shown in Fig. 3. The parts are then glaze fired in a furnace of the type illustrated in Fig. 4. Following the glaze firing operation, the parts are given a finish polish using pumice and water and a solid felt wheel, as shown in Fig. 5.

Parts lending themselves to auto-

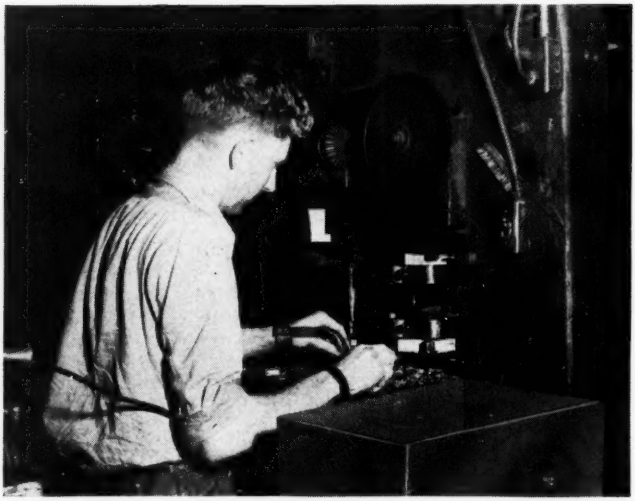


Fig. 1—Name plates are coined in a press equipped with dies operated at pressures from 400 to 800 tons.

Fig. 3—Vitreous enameled name plates chipped during rough grinding are patched, using a paste of ground enamel and water.

matic buffing are so operated upon using a Hammond or Acme automatic buffing setup available for the purpose. Hand buffing is accomplished on the more complicated parts in the normal manner. After buffing and prior to plating, the parts are cleaned in two tanks containing 300 gallons of Metso cleaner operated at a temperature of 180 deg. F. One tank is operated with direct and the other with reverse current. For parts that are not too complicated, both cleaners are used. Where parts have crevices from which it is difficult to remove buffing compound, they are soaked in the Metso cleaner and then hand brushed.

After cleaning, the parts are racked for nickel plating and are processed through the usual water rinses and acid dip to one of two 2700-gallon Stevens semi-automatic plating machines (see Fig. 6) equipped with Udylite-Mallory rectifiers and containing Harshaw XXX bright nickel solution. The tanks used for nickel plating are rubber-lined. As can be noted in Fig. 6, one operator can load and unload the semi-automatic machine at the same station. After nickel plating, parts are re-racked and chromium plated in one of two 650-gallon chromium plating tanks. The 31-deg. Baume solution containing 54 oz./gal. of chromic acid and 0.54 oz./gal. of sulfuric acid is used for chromium plating. After chromium

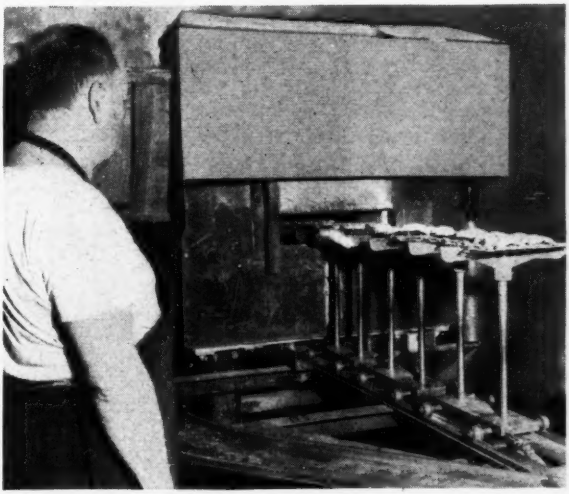


Fig. 4—Vitreous enameled name plates are shown being conveyed through a furnace for glaze firing.

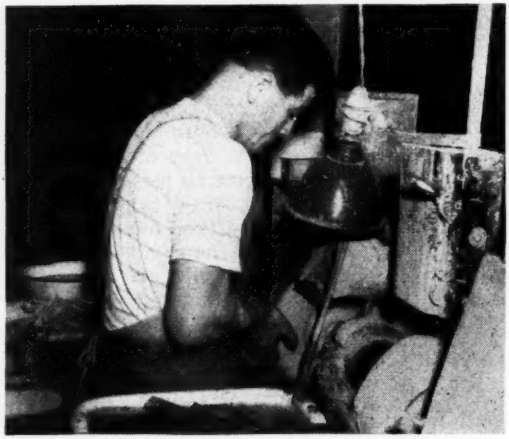


Fig. 5—In this illustration glass fired enamel plates are shown being finish polished, using pumice and water and a solid felt wheel.

plating, the racked parts are hung on a conveyor which carries the parts through a spray rinse followed by a steam dryer so that the rinsed parts may be steam dried at a temperature of 185 deg. Fahrenheit.

Other installations of smaller volume are maintained for special name plate finishing processes, such as silver plating, yellow gold plating, or green gold plating. Mr. Leon Haas, plating supervisor at The D. L. Auld Company, also maintains special oxidizing and coloring solutions so that any finish specified by Auld Company customers can be produced in the plating department.

The wide variety in shape and size of the name plates, together with other parts manufactured and finished

Fig. 6—Operator is shown removing a rack of plated name plates from a Stevens semi-automatic plating machine. Another similar plating machine can be seen in the background.

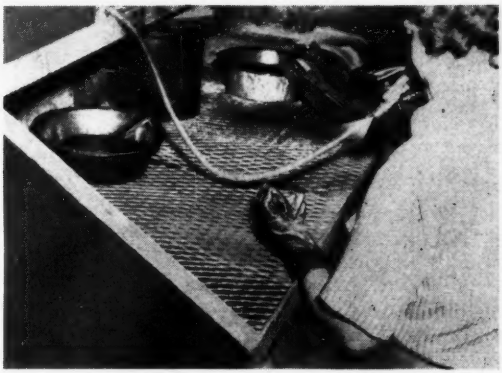


Fig. 7—Using a specially made mask, emblem is sprayed with paint which is subsequently baked.

at the Auld Company makes necessary the manufacture and maintenance of a large number of special racks for plating, particularly in view of the fact that separate racks must be used for nickel and chromium plating to avoid solution contamination. To maintain all these racks, keeping them in repair and well insulated, the company maintains a sizable rack maintenance and insulation department where racks are repaired and coated with Unichrome 218 rack insulation which is applied by dipping and baking at 350 deg. Fahrenheit.

Name plates and emblems made of steel or brass are blanked, provided with the necessary lugs, and plated in much the same manner as described for bronze parts, and are then spray painted through masks, as shown in Fig. 7.

After spray painting, the parts are baked in a Jensen infra-red oven having a flat chain-and-rod-type conveyor. (Unpainted surfaces of Revere metal parts are protected by a clear varnish which is baked on.) Following baking, the parts are subjected to a color buff operation.

Stainless steel name plates and emblems, with and without baked enamel areas, are also produced regularly at The D. L. Auld Company. Art and engineering facilities are available for designing a name plate, emblem, or medallion to meet any particular requirement.

Power for performing the various operations in this division of the Auld plant is provided by four 5000-ampere generators; four 1000 G-E rectifiers; three 1000 Udylite-Mallory rectifiers; one 200-ampere generator for gold and silver; and one 1500-ampere generator for cleaning. All generators are products of The Electric Products Company, Cleveland, Ohio.

The number of operations and processes employed at the Auld Company is further increased when consideration is given to the fact that the company in its complete tool and die department produces as many of the dies and tools used in the process as possible, having a firm belief in the ancient adage, "If you want something done right, do it yourself." For example, the painting masks mentioned above are designed and manufactured by skilled workers in one department. Masks which might be more advantageously produced by electroforming methods rather than mechanical methods are made by one of the job plating plants in the area.

Through the use of the equipment, materials, and processes described in the preceding paragraphs, The D. L. Auld Company readily maintains a

production rate of some 50,000 finished pieces per day, designed to add both beauty and distinction to manufacturers' products.

Good Ventilation Required When Using Solvents

THE operator or manager of the small plant or shop and the occasional user of solvents frequently need to be reminded that good ventilation is essential whenever and wherever solvents are used. Unless operations such as degreasing, thinning, cleaning, and so on, are provided with adequate ventilation, workers may inhale sufficient quantities of solvent vapors to cause illness.

For occasional solvent operations, it is best to do the job outdoors on a breezy day, whenever possible. When the work must be done indoors, it should be carried out in an airy room near an open window. If adequate natural ventilation is not available, occasional small solvent jobs may be done safely by protecting workers with canister gas masks. Of course, the mask protects only the worker who wears it, and care must be taken that other workers in the room are not exposed to solvent vapors. For large jobs which are done only at intervals, a portable blower may be the most practical method of providing protection.

Where solvents are used constantly or frequently, it is usually necessary to provide special ventilating equipment. The equipment may be designed to ventilate the entire workroom. In this case, attention should be given to the area immediately around the solvent operation. For example, a man using solvent to wipe machine parts may be inhaling too much vapor, even if the air in the rest of the room is safe.

Often it is best to use equipment which ventilates locally; that is, which removes the solvent vapor at the point it is released, before it spreads through the workroom. Thus, a ventilated booth, an exhaust hood over the workbench, or a work table with ventilator slots around its edge can protect the operator and also prevent contamination of the air in the rest of the workroom.

Large continuous solvent operations require the use of fully or partly enclosed equipment from which solvent vapor cannot escape. Even the small plant or shop may find such an installation worthwhile for an important solvent operation.—*Safety Research Institute, Inc.*

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NOW—a heat resistant finish that protects—*virtually doubles the life*—of vital parts in hundreds of products like mufflers, engines, boilers, ovens, oil and gas burners. MICO Aluminum has passed 23 different tests for thermal, chemical, and physical stability, and has thoroughly proved itself on the production line. *Investigate* MICO. *Get the facts!* Write today for your copy of the new MICO folder . . .

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Udylite Dipping Baskets. Illustrations of various styles of dipping baskets and handles, together with descriptions and specifications, are contained in a leaflet available from The Udylite Corp., Detroit 11, Michigan.

NEW A-F Rack Washer

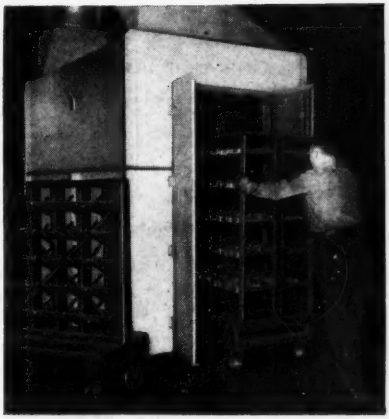
CLEANS RACKS, PARTS TRUCKS FASTER!

★ Warner Gear Corp., Muncie, Indiana, uses hundreds of caster-mounted racks for easier handling of precision gears throughout the plant. In the past, cleaning these racks meant many man-hours of difficult, outdoor work on designated days. When Warner Gear turned to Alvey-Ferguson for a faster and more efficient way to clean the hundred or more racks required daily, A-F Engineers recommended an automatic A-F Rack Washer.

Now, the A-F Rack Washer installed conveniently in the plant keeps plenty of clean racks available, and no special operator is required. Because of its high-pressure oscillating wash system, the A-F Rack Washer strips away every trace of stubborn grease, grinding dust and waste metal. An average of 100 racks are washed *daily* in this plant!

Your plant, too, deserves the benefits of this faster, more efficient cleaning method. Investigate the advantages of the A-F Rack Washer over any other method!

Write for details today!



New A-F Rack Washer now in use at Warner Gear Corp., is making big savings. "Far superior to old washing method," report Warner Gear Engineers.

THE ALVEY-FERGUSON COMPANY

630 Disney Street — ***Established 1901*** — **Cincinnati 9, Ohio**

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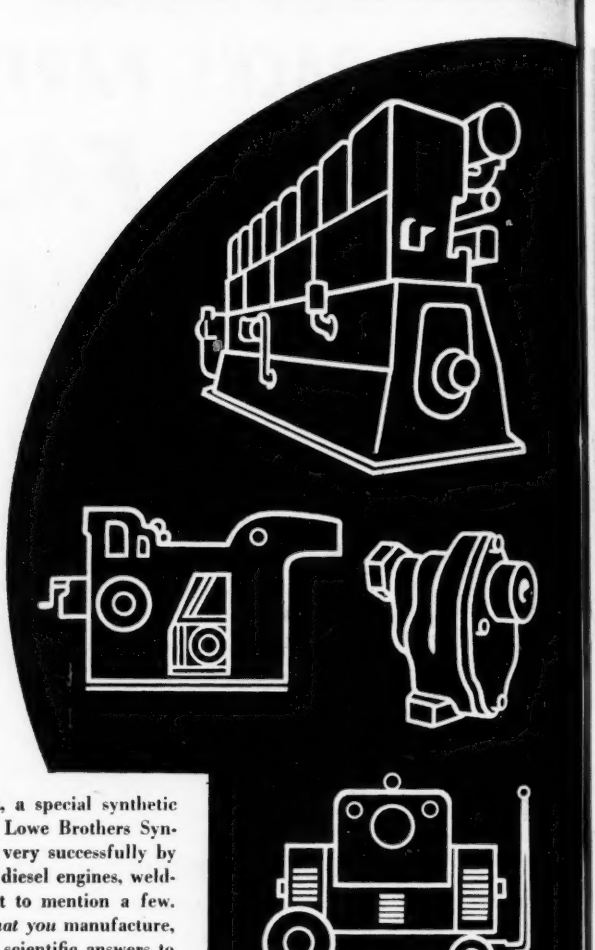
LOWE BROTHERS

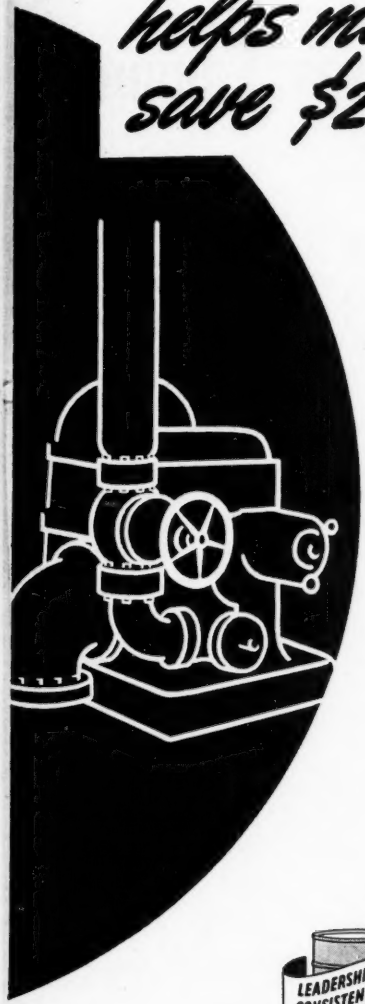


*Lowe Brothers Syn-Fil Dark, a special synthetic filler, was used in this case. Lowe Brothers Synthetic Fillers are being used very successfully by manufacturers of machinery, diesel engines, welders and printing presses, just to mention a few. Remember—it matters not *what you* manufacture, Lowe Brothers may have the scientific answers to your finishing requirements or problems.

This advertisement is based on facts from the Lowe Brothers Industrial Case History Files.

"FINISHING SPECIALIST"

helps manufacturer save $25,000 a year!



Just by taking full advantage of the broad knowledge and professional advice of a Lowe Brothers "Finishing Specialist," and utilizing the benefits of a quality-made Lowe Brothers industrial product,* a turbine manufacturer greatly reduced delays and rejects—slashed production costs $25,000 in just twelve months, without any sacrifice in the quality of the finish!

This is a typical example of the way Lowe Brothers "Finishing Specialists" are serving manufacturers of many types and sizes today. Have one analyze *your* operation. His vast experience and keen interest in industrial finishing form a combination that may help make yours a better product—and save time, money and manpower as well. There is no cost or obligation . . . write today for complete information.

THE LOWE BROTHERS COMPANY • DAYTON 2, OHIO

LEADERSHIP THROUGH CONSISTENT SERVICE

Lowe Brothers
FINISHES FOR INDUSTRY

Clean Air

For Spray Equipment

By ROLLIN H. WAMPLER

LARGE quantities of compressed air are used in product finishing. The quality of this compressed air is of great importance. If it contains moisture, oil, or dirt, the finished surface may be spoiled in spraying, necessitating expensive retouching work or even refinishing. In addition, effective removal of dirt and moisture lengthens the life of equipment driven by compressed air, such as rubbing machines, disc sanders, rotary grinders, motors for pressure tank agitators, and so on.

In one plant a better designed compressed air system, combined with proper maintenance, cut down the repair work 35 per cent, increased the speed of finishing, and resulted in a better quality finish.

The dirt always present in the atmosphere about industrial plants is a source of dirt in the finish. While this problem is not always easy to solve, contamination of the compressed air is inexcusable because it is easy to remedy.

Dirt gets into the air through the air intake on the compressor if the compressor is not equipped with a filter or if the filter is not working properly. Oil originates in the lubricating system of the compressor. Moisture condenses from the air when it is compressed. Moisture is always present in the air, in greater or lesser amounts according to atmospheric or weather conditions. When the air is compressed, the water vapor

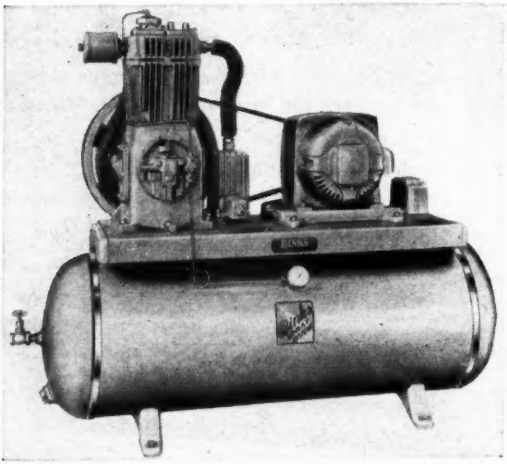


Fig. 1—The Binks Type BF Two-Stage Air Compressor features a combination air filter and silencer, and is designed to furnish from 7 to 40 cubic feet of air per minute at 160 to 200 lb. pressure. *(Photo courtesy Binks Manufacturing Co., Chicago 12, Ill.)*

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DOPES

FLIGHT-TESTED AIRCRAFT FINISHES

THINNERS

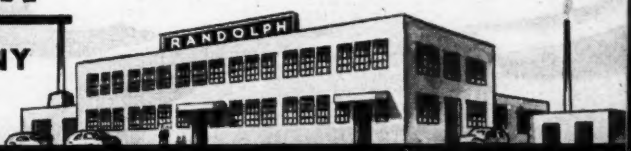
THE EXACT FINISH IN THE PRECISE COLOR FOR YOUR NEEDS

We invite you to submit your difficult finishing problem to us. There is no cost or obligation to you for the advice of our expert technicians. We will welcome the opportunity to serve you.

Randolph

PRODUCTS COMPANY

Carlstadt, New Jersey



DOPES · LACQUERS · ENAMELS

is also compressed with it as it passes through an air compressor. Although the volume of the air is greatly reduced and the ability of this volume to contain the moisture in vapor form is correspondingly reduced, the temperature of the air—as a result of the reduction in volume and increase in pressure—has risen to such an extent that the moisture carrying ability of the air has increased several times more, as a result of the temperature increase, than it has lost by reason of reduction in volume. Then, as the air passes out into the distribution system, it is cooled and, as its temperature drops, it can no longer retain all of the moisture in vapor form, so the moisture drops out as liquid water. The moving air in the system contains fine droplets of water and oil (entrained vapor) that must be removed. Water is particularly noticeable in the morning by reason of the fact that the plant will have cooled down and condensate will have had an opportunity to accumulate over a relatively long period of time when the air lines were not being used.

Dirt from the outside air is removed by a filter on the compressor intake. Also, as a result of moisture in steel pipe, pipe scale and rust forms and can reach the point of air use to clog equipment, if it is not removed by filters at the point of use. Moisture is removed by cooling the air at the proper point and collecting the condensate. This cooling should be done at the compressor and storage tank. Entrained oil and water are removed by mechanical separators consisting of baffles and filters at the points of use.

The compressor should be located in a cool, dry place where there is an abundance of clean air. It should be

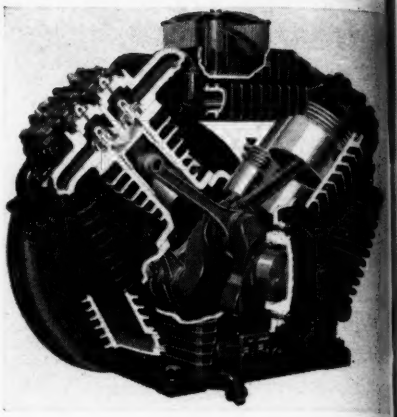


Fig. 3 — Cutaway view of a DeVilbiss Four-Cylinder V-Type, Two-Stage Air Compressor showing intake air filter and various operating parts of the unit
(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)

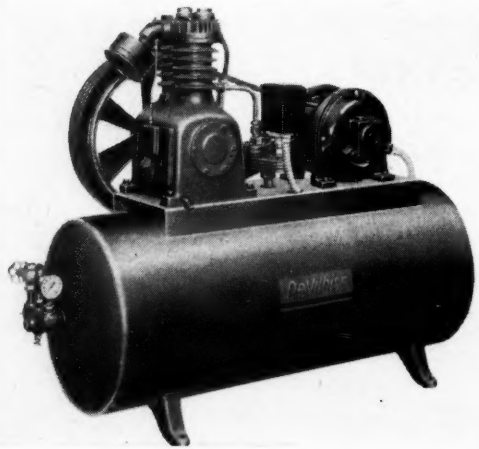
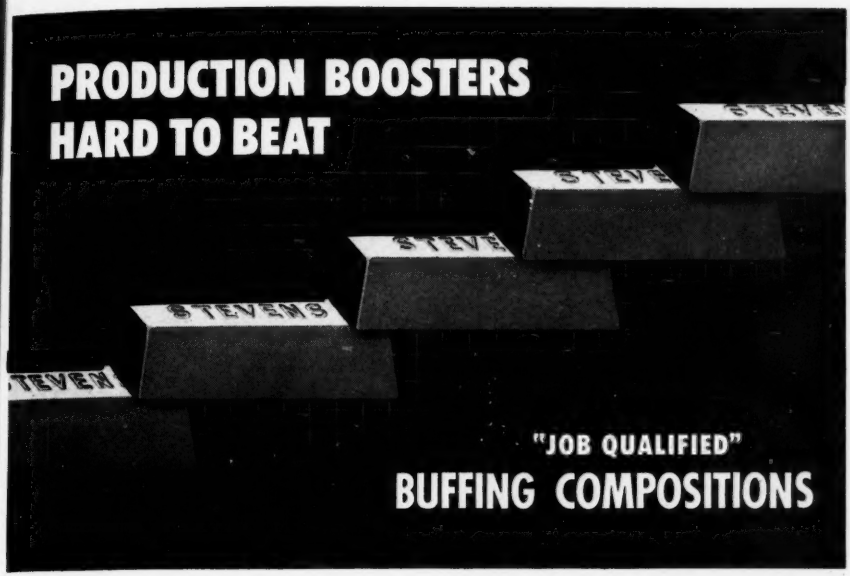


Fig. 2—The air intake on the compressor at the upper left (on this industrial compressor and tank unit) should be inspected and cleaned regularly, and the filter element replaced as required. The tank should be drained regularly by means of the drain cock at the bottom of the outlet manifold shown on the left.
(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)



Set new standards in production and work finish

From day to day, production finishing requirements are becoming more critical. The demand for faster, better work becomes more insistent. That's why it's important to find the finishing materials and methods that will push your production up to the peak and keep it there.

It will pay you to learn why Stevens "Job-Qualified" metal finishing materials and methods are accomplishing such outstanding results for the leaders in your industry today—and more important, how similar materials and methods can solve your production finishing problems.

There is a nearby Stevens Sales and Service Representative eager to work with you—capable by experience and ability to recommend "qualified-to-do-the-job" materials and methods—and then follow through as needed. The value of Stevens Buffing Service is already written in the finishing production records of many manufacturers who are working today under greater pressure than ever before.

Stevens' Finishing Productioneers and laboratory staff have helped them break some very tough production bottlenecks . . . usually with a *plus* of increased production, better finish and lower operating costs. *It's the kind of a job we'd like to do for you.* What's your problem?

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LEADING MANUFACTURERS OF POLISHING, BUFFING, PLATING EQUIPMENT AND SUPPLIES

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METAL FINISHING EQUIPMENT AND SUPPLIES DIVISION

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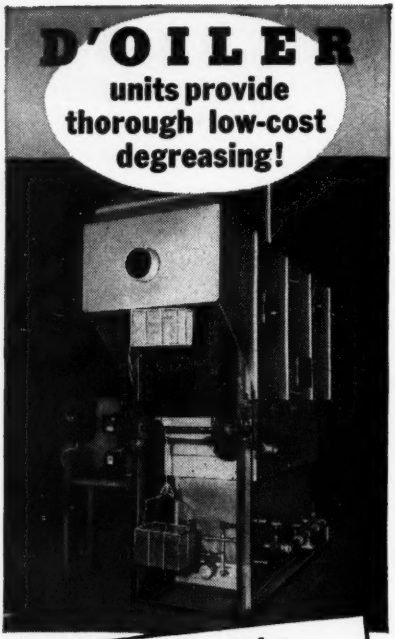


If the job calls for a degreaser—there's a D'Oiler for the job!*

D'OILER engineers — pioneers in solvent degreasing and de-oiling—have developed a D'OILER model for every purpose . . . volume work and small batch dips, hand-operated or automatic, one dip or three dip, vapor spray machine or custom-built devices for special jobs. Illustrated above is a three dip automatic for batch degreasing of small parts.

Avoid the pitfalls of improper degreasing methods by getting the expert recommendations of our technical staff.

*There are metal cleaning problems which are solved by methods other than degreasing; we shall inform you frankly and thoroughly of the methods best suited to your operations.

Our long experience is ready to help you do a finer, faster cleaning job. For D'OILER information on your degreasing operation, WRITE TODAY.

Mechanical
PROCESS COMPANY
P. O. BOX 88, SOUTH ORANGE, N. J.

located as far as possible from machining and sanding operations, spray booth exhausts, and exhaust steam jets. Some prefer to extend the air intake to the outside of the building. Location of intake is important so that air is not contaminated by harmful acid gases discharged from pickle rooms or similar installations.

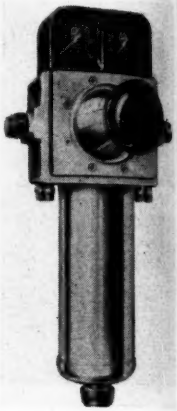


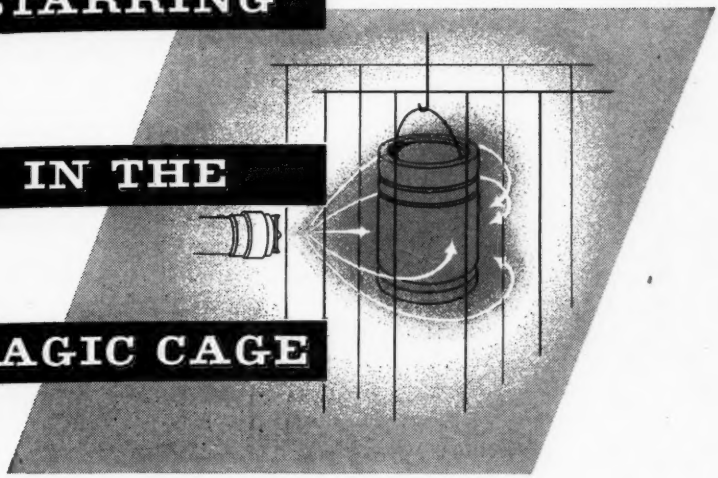
Fig. 4—Binks E-75 Oil and Water Extractor, which also includes a device to regulate the spraying air pressure and two pressure gauges which show the main line air pressure and the regulated air pressure (*Photo courtesy Binks Manufacturing Co., Chicago 12, Ill.*)

In almost every case an outside air intake will provide the coolest and driest air available. The latent heat load inside a building plus the higher moisture content experienced in air-conditioned plants results in more water in compressed air lines than would result from air drawn in from outside the plant. In addition, denser air is usually obtained from outside the plant, and such air may be compressed more efficiently.

The better compressors have cooling fins on the cylinders and air lines to dissipate the heat from the compressed air. Some have other means for cooling the air.

The air storage tank should be located nearby. This tank be of sufficient capacity so that the air has enough time for cooling and for the condensed moisture to settle out before the air is used. The tank should have a drain

STARRING IN THE MAGIC CAGE



New M & W Finishes work wonders in the increasingly popular CONVEYORIZED ELECTROSTATIC SPRAY SYSTEMS. Especially developed to provide uniform results with this new finishing process, M & W lacquers and synthetic enamels have just the right properties for smooth, even spraying. The tiny particles hug the surface of your product . . . minimizing overspray!

Give your products uniform coatings by using M & W Flash Baking Enamels . . . Duart Wrinkle Enamels . . . Metalustres . . . and a host of other M & W Finishes, in colors as well as clear, for your electrostatic spray system. Take advantage of M & W's 73 years' experience in pioneering and producing finishes for spray, dip or brush application. Let an M & W Sales Engineer suggest the right finish for your products.

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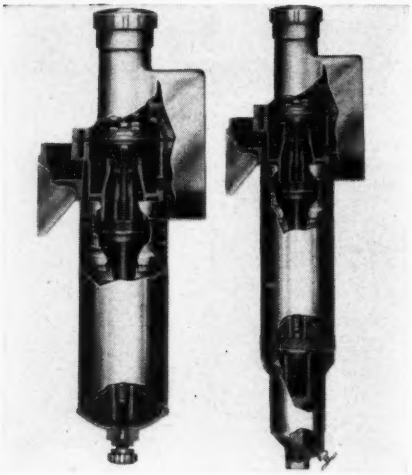

Fig. 5—Cutaway side views of DeVilbiss Type HLC Air Transformer (left) without and (right) with automatic drain
(Photo courtesy The DeVilbiss Co., Toledo 1, Ohio)

cock or an automatic drain to dispose of the condensate. It is seldom possible to use an air receiver with sufficient capacity to cool the air so that all the moisture picked up during compression will be condensed in the air receiver. Usually the receiver is simply large enough to eliminate pulsations from the air stream, provide sufficient reservoir for proper operation of controls, and a slight reserve in the air line.

The main air lines should all be sloped to drain in one direction. Sometimes they drain back to the storage tank (countercurrent), although some equipment manufacturers recommend that they slope towards the point of use. In the latter case, there should be an automatic drain at the low point. Take-off lines should rise a few inches above the main lines before dropping down to the points of use. If dips or other low points in the main lines are unavoidable, automatic drains which require no attention should be installed at these points to prevent accumulations of condensate.

Each outlet for spray equipment should be provided with a unit to alter air pressure according to need, and remove dirt, oil, and water. Equipment to accomplish these purposes is illustrated by photographs accompanying this article.

The compressor should be given more attention than it usually receives. The air intake filter should be inspected frequently and cleaned or replaced as required. A clogged filter seriously hampers the efficiency of the compressor. The compressor should be properly lubricated according to the directions of the maker. If the piston rings become badly worn or the cylinder walls become scored, the air will pick up much more oil than it should. The necessary repairs in time will save plenty of trouble.

The storage tank should be drained at regular intervals unless it is

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Superior for Polishing and Buffing

When you order FELT WHEELS specify PARAMOUNT BRAND FELT WHEELS for top quality and uniformity.

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*Made Under Patent Numbers 2,027,863; 2,094,650; 1,573,961; Re. 19,894; 2,140,208. Other Patents Pending.

For Over 50 Years the Greatest Name in Buffs

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equipped with an automatic drain. It is surprising how often this chore is neglected.

The air filtering units should be drained daily unless they are equipped with automatic drains. The writer on one occasion traveled 20 miles to a customer's plant on a complaint that was solved by merely draining an air filtering unit and replacing the filter element.

It is a good practice, when possible, to make one man responsible for the proper maintenance of the entire compressed air system. He should have a regular schedule for inspecting the compressor, draining the storage tank, and checking the condition and operation of air cleaning equipment. Automatic drains greatly reduce the attention required.

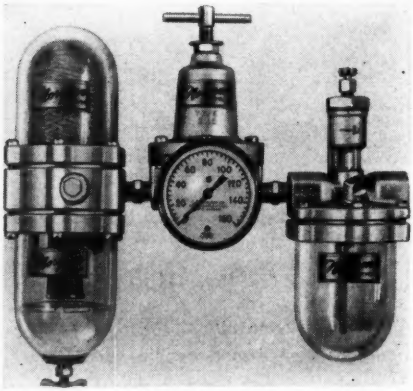

Fig. 6 — The "Puraire" Regulator Unit here illustrated is a combination Purifier and standard pressure regulator with gauge. The Purifier is divided into a lower chamber which contains a double Monel wire screen and baffle plate, and an upper chamber which contains a blue yarn absorbent element. Moisture, dust, dirt, and pipe scale are separated from the air in the lower chamber. The blue yarn absorbent element in the upper chamber turns pink when moisture gets past the filter, and thus shows the operator that the lower filter bowl needs to be drained.

(Photo courtesy C. A. Norgren Co., Denver, Colo.)

Fig. 7—Designed for use with portable compressors or where air supply is limited is the Black Arrow Model N9500 Light Duty Air Conditioner, here illustrated. The Air Conditioner is equipped with a brass filtering element, a light duty regulated pressure outlet, and a draincock at the bottom of the tube for daily draining.

(Photo courtesy Black Mfg. Co., Baltimore, Md.)

Tall Oil Bulletin No. 8, a bibliography and abstract of all published literature, including patent information on the usage of tall oil in the soap, detergent, sulfonating, emulsifying, and related industries, is available from the National Southern Products Corp., 630 Fifth Ave., New York 20, New York.

Mul Emulsion Cleaner. A booklet containing cost figures taken from actual plant operations on the use of emulsion cleaning compounds, together with a case history describing the use of Mul as an additive to caustic and alkaline stripping baths to provide more complete removal of paints and lacquers, is obtainable from The Du Bois Co., Cincinnati 3, Ohio.

Wheelco Bulletin MC-1 features the Multi-Switch Capacitrol, an indicating pyrometer controller with the "Distant View Scale." Available from the Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill., the bulletin includes such data as: suggested applications, measuring and indicating features, control functions, method of applying the "Wheelco Electronic Principle," scale ranges, and so on.

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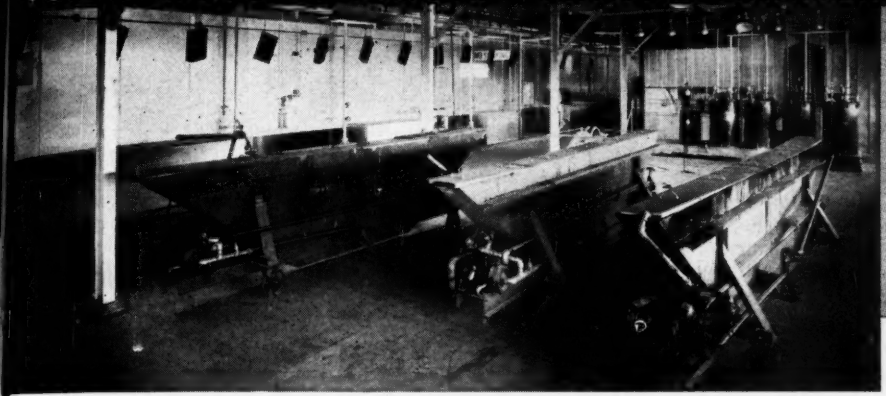

Portable Dip Enameling Tanks Permit Application of FOUR DIFFERENT COLORS on ONE CONVEYOR PRODUCTION LINE!

Illustrated here are parts of a complete self-housed Mahon Finishing System recently installed for the Coleman Company, Wichita, Kan. It is the second complete Mahon system purchased by the Coleman Company in four years. This Complete Finishing System, which was built adjacent to manufacturing buildings, consists of a six stage Cleaning and Rust Proofing Machine, one Dry-off Oven, a Filtered Air Supply System, three Hydro-Filter Spray Booths—one of which is 70 ft. long, one Paint Baking Oven for sprayed parts, one Paint Baking Oven for dipped parts, and four Portable Dip Enameling Tanks which permits switching to any one of four colors without interrupting production. The whole system was planned, engineered, built and housed by Mahon—one responsibility for final results. Progressive manufacturers everywhere are well aware of the important part modern, efficient, cost-reducing production equipment plays in today's competitive markets. That is why so many successful concerns turn to Mahon for top efficiency in modern finishing equipment . . . they know that the Mahon organization has pioneered development in this highly specialized field for twenty-nine years . . . they know also, that the experience of Mahon engineers, which is world-wide in scope and covers virtually every industry where finishing constitutes a major production operation, has endowed them with a wealth of technical knowledge and practical know-how not available elsewhere. Write for Catalog No. 649, or see it in Sweet's Mech. Ind. File.

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Engineers and Manufacturers of Complete Finishing Systems—including Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens. Also, Core Ovens, Hydro-Foam Dust Collectors, and many other Units of Special Production Equipment.

MAHON

The A. E. S. Convention In Review

Reported by EZRA A. BLOUNT

THE American Electroplaters' Society certainly received a sincere, cordial welcome to Milwaukee upon the occasion of the 36th Annual Convention, held June 27-30. Upon entering the city, visitors could not fail to be impressed by the huge electrically lighted sign on the Milwaukee City Hall, "Welcome American Electroplaters." In the same spirit, Mayor Frank P. Zeidler himself attended the opening session of the Convention and greeted the members and guests. William C. Geissman, general chairman of the Convention, in welcoming the group, introduced the key members of his hard-working committee. That Mr. Geissman's committee spared no efforts to arrange a fine social and educational program is illustrated in part by the accompanying photographs, and by the technical papers presented. It is not possible to photograph the warm spirit of hospitality which prevailed at this Convention; that will remain a very pleasant memory in the heart of each person present.

In connection with the Convention, the International Fellowship Club observed the 25th anniversary of its founding at an annual luncheon, which was followed in the evening by the traditional Open House sponsored by the club, at which Government Bonds and other door prizes were distributed. In addition, the International Fellowship Club sponsored a golf tournament at the North Shore Country Club, under the chairmanship of Joseph J.

Fig. 1 — At the busy registration desk Robert J. Steuernagel, finance committee chairman, may be seen assisting a registrant while Frank J. Marx, registration chairman, looks on from the background. Checking in at the extreme right is S. S. Johnson, then president and now past president of the A.E.S.

Fig. 2—A view of the speakers' table at the luncheon celebrating the 25th anniversary of the founding of the International Fellowship Club. President Louis M. Hague, Hanson-Van Winkle-Munning Company, can be seen immediately to the left of the microphone and on Mr. Hague's right is Wilfred S. McKeon, founder of the Club. At the meeting which followed the luncheon, the following officers were elected: president, Rudy Hazucha, Clinton Company; first vice president, George Nankervis, George Nankervis Company; second vice president, A. P. Munning, Munning & Munning Company; third vice president, Al Braun, Agate Lacquer Company.

Duffy, Jr., Pennsylvania Salt Manufacturing Company.

One of the outstanding social events of the Convention was a picnic and outing held at Brown Deer Park and attended by between 500 and 700 of the more than 1,000 Convention registrants. Chairman McGuire of the Outing Committee served beer and lunch and provided entertainment in the form of the famous Blatz Legion Band which favored the guests with genuine German band music. Games and contests of all kinds were provided for the amusement and entertainment of the guests and an East-West softball game furnished entertainment for the more athletic members.

A large group photograph was made at the picnic showing the members and guests present. Copies of this picture may be secured from Henry Bornitzke, Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee, Wis., for $1.75, including mailing charges.

Through the courtesy of the Pabst Blue Ribbon Brewing Company, Con-

Fig. 3 — During the Open House sponsored by the International Fellowship Club part of the Hotel Schroeder Crystal Ballroom was set aside for dancing. While dancing was not in progress, A.E.S. members and guests gathered at tables for rest and refreshments.

Fig. 4—In the Hotel Schroeder Empire Room A.E.S. ladies assembled for the "get acquainted tea" arranged by Mrs. R. F. McGuire, chairman of the ladies' committee.

(*All photos by Products Finishing*)

vention visitors were invited for a tour of the Pabst bottling plant and an Open House in the Pabst Blue Ribbon Hall and summer garden on two evenings while the Convention was in progress. Events of this nature arranged by the committee only served to emphasize the spirit of friendliness which prevailed during the entire Convention.

At the final banquet at the close of the Convention, an excellent dinner followed by a floor show and dance concluded the social festivities. As usual, at this banquet drawings for the prizes given by the Hanson-Van Winkle-Munning Company and the Belke Manufacturing Company were held. Awards of prizes for papers published during the year were also announced at the banquet and are as follows: Founders' Gold Medal to W. A. Wesley, W. W. Sellers, and E. J. Roehl for the paper "Electrodeposition of Nickel at High Current Densities"; $50 Plating Award to Lyman Sperry and Maurice Caldwell for the paper "Destruction of Cyanide Copper Solutions by Hot Electrolysis"; A.E.S. Gold Medal to C. F. Nixon for the paper "A Plater's View of Design"; Mechanical Finishing Award of the A.E.S. sponsored by the Lea Manufacturing Company to Arthur P. Schulze for the paper "Mechanical Finishing with Roto-Finish Techniques"; and Chromium Plating Award of the A.E.S. sponsored by the Nutmeg Chrome Corporation to Robert Seegmiller and Vernon A. Lamb for the paper "Re-Oxidation of Trivalent Chromium in Chromic Acid Plating Baths."

In addition to the social activities outlined above, a social program for the ladies alone was arranged by Mrs. R. F. McGuire and the members of her hard-working committee. A view of the guests at the "Get Acquainted Tea" is shown in an accompanying photograph. In addition to this function, the traditional Aunt Ella's Society Luncheon, sponsored by Oakite Products, Inc., and a "Plato" Party, sponsored by the International Fellowship Club were held. Another luncheon and style show completed that part of the program arranged exclusively for the ladies.

From a social standpoint alone, the Convention will remain a memorable one, outstanding in A.E.S. history.

Plant Visitations

Arrangements for the Convention visitors to take trips through Milwaukee manufacturing plants were made by Omer Doyle, chairman of Plant Visitations. At the Nash Kelvinator Corporation (Body Division), the manufacture and finishing of Nash bodies was viewed. The plating department of Globe Union, Inc., was a point of interest, as well as the electrical

Fig. 5—A partial view of the final banquet showing in the background the speakers' table and in the center foreground the table at which most of the members of the Milwaukee Convention committee were seated

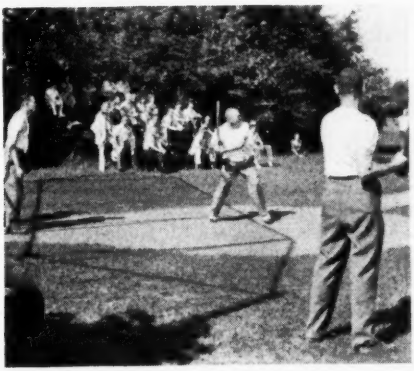


Fig. 6 — During the East-West ball game held in connection with the picnic and outing, A.E.S. President Logozzo is shown waiting for the pitch.

Fig. 7 — A group of platers assembled in the Pabst summer garden on one of the two evenings that the Pabst Brewing Company was host to Convention guests. The group at the right includes Frank J. Marx, Henry Bornitzke, and Glen A. Schwemer of the Milwaukee Convention committee, and William J. Neill, A.E.S. first vice president.

Fig. 8—The Columbus Branch exhibit which was awarded first prize for the wide variety of finishes exhibited and the carefully documented record of each process used

control department of the Allis Chalmers Manufacturing Company. A trip through the plant of the Milwaukee Journal Company completed the plant tours.

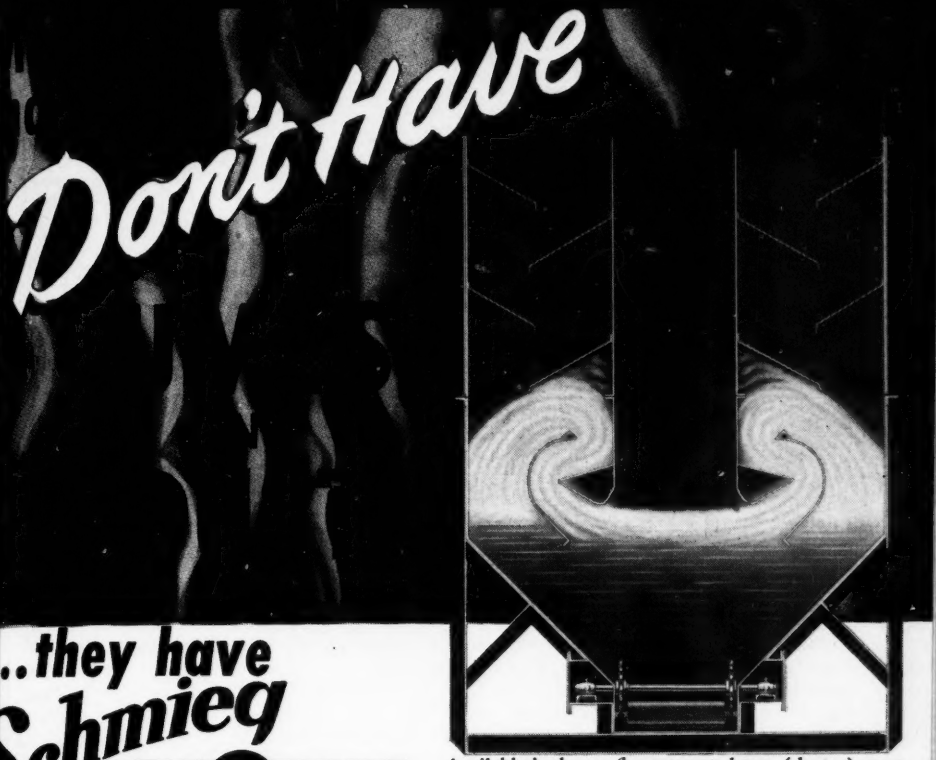
Branch Exhibits

Since no Industrial Finishing Exposition accompanied the Convention this year, a center of interest was the group of Branch Exhibits displayed in the East Room of the Hotel Schroeder. First prize was won by the exhibit prepared by the Columbus Branch, with the Twin City Branch and the Chicago Branch being awarded second and third prizes respectively. Mr. John H. Feeley of the Montreal Branch presented what might be termed a combined educational program and branch exhibit in his daily demonstration of the ancient art of silver burnishing. During his demonstrations Mr. Feeley was continuously surrounded by a group of interested electroplaters.

N.A.M.F. Activities

The National Association of Metal Finishers held its Fourth Annual Meeting during the Convention and elected officers and directors. The new officers are: president, Harold E. Coombes, Crown City Plating Co.; Pasadena, Calif.; first vice president, W. O. Zinn, National Plating Co., Chicago; second vice president, Wm. F. Walton, Walton and Lonsbury, Attleboro, Mass.; third vice president, F. A. Truden, Southern Finishers, Inc., Nashville, Tenn.; and treasurer, G. Burgess, Electro-Plating Service, Inc., Ferndale, Michigan. The new directors are: Bruce E. Warner, New England Plating Co., Inc., Worcester, Mass.; J. P. Malooly, Western Rust-Proof Co., Chicago; Oliver Pendlay, Cadmium & Nickel Plating Co., Los Angeles.

Fig. 9 — The Branch exhibit prepared by the Los Angeles Branch indicated the great variety of finishing processes employed in that area and served as an indication that the 1951 Convention to be held in Los Angeles should prove both interesting and instructive.



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A.E.S. Business Meeting

At the final business meeting, in addition to other business, new national officers of the A.E.S. were elected as follows: past president, S. S. Johnston; president, Arthur W. Logozzo; first vice president, William J. Neill; second vice president, C. F. Nixon; third vice president, Franklyn J. MacStoker.

Chicago was selected as the site of the 1952 Convention, Los Angeles having been selected previously as the site of the 1951 Convention. The 1950 Convention will be held at Boston and sponsored by the Boston Branch under the direction of Manson Glover, general chairman of the Convention committee.

A slide film, prepared by the A.E.S. Finance Directing Sub-Committee through the courtesy of the Pennsylvania Salt Mfg. Co., was presented by Bryce Gray, Jr., assistant advertising manager of Pennsalt. The film, prepared for sending to Branches to assist them in interesting company officials in becoming sustaining members of the A.E.S. and thus contributing to the Research Fund, pictures the various research projects and describes briefly the work being done, showing how such work contributes to the advancement of the plating industry. Mr. Gray also presented the film at one of the educational sessions of the Convention.

Leslie Diveley
Educational Chairman

Technical Papers

The well-rounded educational program arranged by Leslie Diveley, educational chairman, and the A.E.S. editorial board, was of great interest to the members and guests attending the Convention. As can be seen by the accompanying photograph, the Crystal Ballroom of the Hotel Schroeder was well filled with interested listeners during the educational meetings.

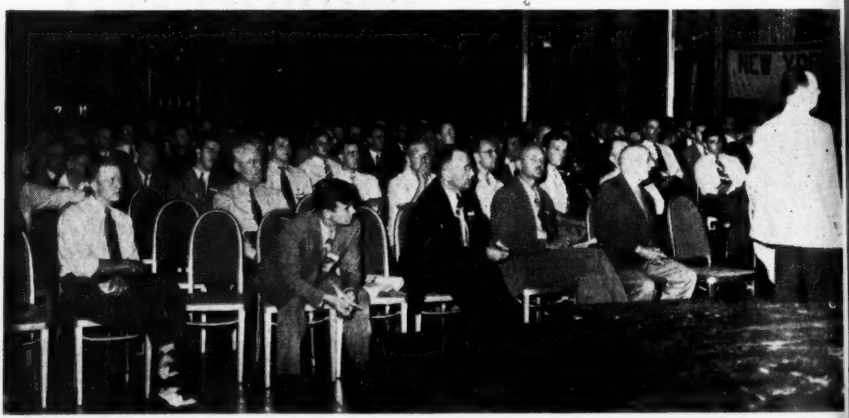
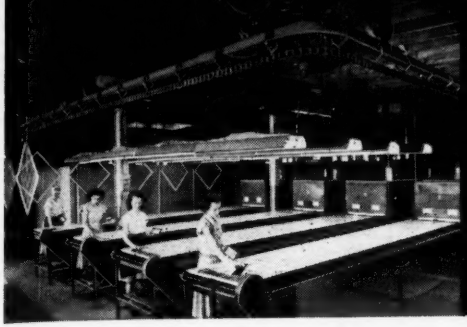


Fig. 10—A view of A.E.S. members and guests assembled for one of the educational sessions.

HERE'S CUSTOMER'S OWN PROOF that JENSEN Infra-Red Ovens Bake *Pastel* Shades Successfully!



It's true—*nothing succeeds like success!* Three years ago Cadillac Manufacturing Co., Mt. Clemens, Mich., faced this problem: How to bake 10 to 12 different ***pastel*** shades of enamel on metal tile *without danger of overbaking certain areas and underbaking others.*

They called in Jensen, who designed and built a special "dual-heat" infra-red oven with ***"nested" lamps*** to do the job.

Results have been so gratifying — color so consistent — beauty so outstanding—sales so increasingly up, up, up — that now Cadillac has installed **FOUR** Jensen "nested-lamp" infra-red ovens to handle production requirements!

Jensen "dual heat" Infra-Red Ovens are designed to industry's specific needs. Write us about your problem today!

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In Finishing Production . . . the Future Belongs To Men Who *Plan* For It!

R. E. Parkinson

"The Customer Looks at Plated Products," by Thor H. Westby and R. E. Parkinson, Merchandise Testing and Development Laboratory Sears, Roebuck & Co., Chicago, Ill. Paper was presented by Mr. Parkinson, and questions following the presentation were answered by Dr. Westby.

In the Sears laboratory, purchased products, principally auto parts, chromium furniture, and plumbing fixtures, must be inspected for appearance and tested for durability of that appearance, since the buyer cannot tell the quality of plating by visual observation. Specification buying is employed, using A.S.T.M. thickness specifications as a guide. By establishing standards based upon the severity of expected service, and by coordinating the results of salt spray tests with thickness measurements, the laboratory has reduced product returns, for the reason of defective plating, to zero. Grade labeling assists the customer in his efforts to judge quality.

● ● ●

Dr. Thor H. Westby

"Quality Control in Electroplating," by R. E. Harr, Western Electric Company.

The speaker pointed out the relationship between process control and plant layout, and observed that quality cannot be inspected into a product, but must be built into the process. To ensure proper plate thickness, parts are classified according to ampere-hour requirements, and are processed through mechanical plating equipment accordingly. Solutions are controlled by regular tests and additions, using a 30-day average daily addition. The speaker showed by means of slides how process inspection and analytical trend charts could be used to control both the plating process and the quality of the finish, and further observed that such records could be used as reports to customers.

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R. M. Shock

"The Job Plating Business," by Raymond M. Shock, National Association of Metal Finishers, Inc.

In a brief review of the job plating industry, Mr. Shock stated that in Detroit jobs shops do less than 10 per cent of the total plating volume, in the New York area they have about 20 per cent of the business, in Cleveland they do 80 per cent of the total volume, and in Chicago likewise a very large pecentage of the total plating volume is contracted. He pointed out that lack of inspection in job shops is a serious handicap, but added that the majority of platers in the N.A.M.F. plated to good specifications, and further added that quality could be what the customer wanted. He expressed his belief that the plating industry had excellent future prospects and recommended research to develop new markets and uses for plating.

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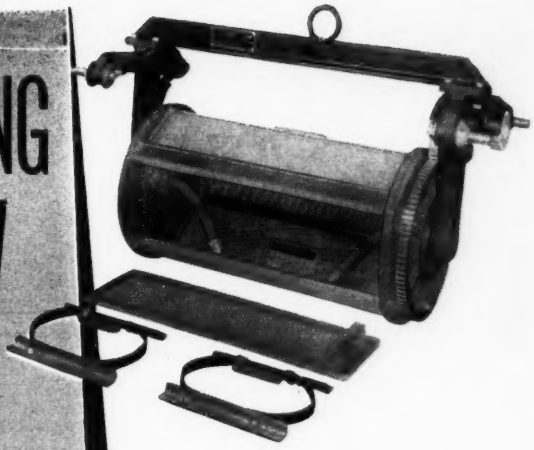

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"AVAILABILITY OF PLATING MATERIALS"

J. J. Duffy, Jr.

"Alkalies, Including Silicates and Phosphates," by J. J. Duffy, Jr., Pennsylvania Salt Mfg. Co.

The paper was presented by Wm. J. Hennessy who pointed out that an adequate supply of alkaline materials is available. Caustic soda and soda ash are the least plentiful but inasmuch as the plating industry uses less than 1 per cent of the total volume used, adequate supplies are available for that industry.

"Cadmium," by L. K. Lindahl, The Udylite Corporation.

Paper was presented by L. V. Nagle who pointed out that cadmium is refined from zinc ore and is a by-product of zinc refining. At the present time zinc is not in great demand and, in consequence, its production is expected to decrease with the result that the supply of cadmium will be reduced.

"Chromic Acid and Chromates," by Henry Mahlstedt, United Chromium, Inc.

Mr. Mahlstedt explained that as a result of new manufacturing facilities an adequate supply of chromic acid and chromate chemicals was now available. Both the ore supply and plant capacity to refine the ore were described as ample.

L. K. Lindahl

"Cyanides," by Ed McGovern, E. I. du Pont de NeMours & Co.

Mr. McGovern described the cyanide situation as being somewhat similar to the chromate chemical situation in that no shortage is in prospect. Further, a small price decrease in metal cyanides was reported.

"Lead," by Charles R. Ince, St. Joseph Lead Company.

The paper was presented by Vincent Mattacotti, publicity chairman of the Convention committee, who reported that although there is less lead available now than at this time last year, there has been a corresponding decrease in its use and a substantial decrease in the price, so that in the overall picture, lead need not be considered in short supply at present.

"Nickel," by Clarence H. Sample, The International Nickel Co.

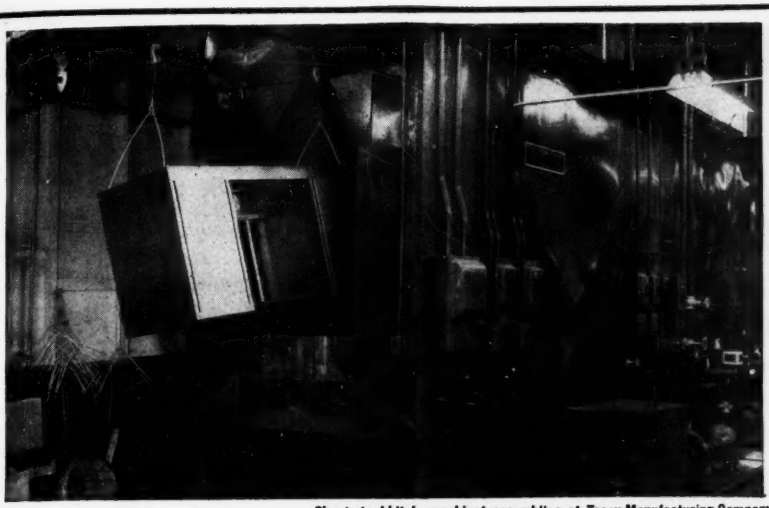
Mr. Sample reported that although over the years there has been a 500 per cent increase in the use of nickel as required for automobile production and that a new record tonnage of nickel was supplied to the plating industry in 1948, sufficient nickel will continue to be available.

Henry Mahlstedt

Ed McGovern

Clarence H. Sample

Dr. B. W. Gonser



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Ralph F. Burns

"Tin," by Dr. B. W. Gonser, Tin Research Institute, Inc.

This paper was presented by Robert J. Nekervis of the Tin Research Institute, Columbus, Ohio, who advised that a year's supply of tin was currently available, including that currently stockpiled for Government use. Further easement of tin restrictions are to be expected within the year so that the metal may be considered to be in ample supply.

"Zinc," by Ralph F. Burns, The New Jersey Zinc Sales Co.

Mr. Burns outlined the zinc production and consumption picture, pointing out that of the 806,000 tons of zinc consumed in 1948, most of the metal was used for galvanizing, electroplating, and die casting, a lesser amount for brass, and still smaller amounts sold for other purposes. He emphasized the fact that sufficient facilities are available to supply zinc required for Government stockpiling and provide zinc for industrial users.

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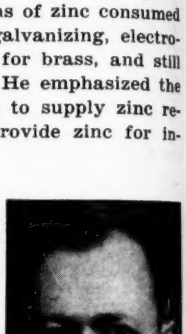
"PR Cyanide Copper Plating," by George W. Jernstedt, Westinghouse Electric Corporation.



George W. Jernstedt

Mr. Jernstedt traced the development and investigation in connection with the periodic reverse cyanide copper plating process. Features of the bath are that it contains no organic addition agent but rather a metallic brightener called Wes X. Plating is carried out at 200 to 300 amp./sq. ft. and thickness built up at the rate of 0.01 inches per hour. The process cycle, consisting normally of 5 seconds' plating followed by one second de-plating (or some multiple of this cycle), exerts a leveling and brightening effect on the deposit and is considered by Mr. Jernstedt to offer cyanide copper plating a new lease on life. Through the use of the process, polishing costs can be reduced and, in some cases, buffing may be eliminated. It is desirable to filter the copper solution continually through activated carbon to eliminate all organic impurities from the solution. Both generator field reversal and contactor reversal systems for use with the process were described.

● ● ●

"Electrodeposition of Nickel at High Current Densities," by W. A. Wesley and W. W. Sellers, The International Nickel Co., and E. J. Roehl, The Thomas Steel Co.

Dr. W. A. Wesley

The paper was presented by Dr. Wesley who described the theoretical work confirmed in part by subsequent experiments in which the limiting factors in the speed of deposition were investigated. The speed at which nickel ions can get through the cathode film limits the current density and the speed of deposition. A theoretical equation for the deposition of nickel was examined and ways to increase or decrease each factor in that equation so that nickel could be deposited more rapidly were investigated. As a result of these calculations it was determined that nickel from a Watts bath may be deposited at 4000 amp./sq. ft. and from a nickel chloride bath at 8400 amp./sq. ft. In order to accomplish this result a very rapid flow of solution past the electrodes was required and apparatus was constructed to accomplish that result. Using this apparatus a sound deposit was obtained at 4600 amp./sq. ft. with a solution flow of 700 feet per minute. The author concluded that the speed of nickel plating is limited not by chemical or electrochemical but by mechanical factors.

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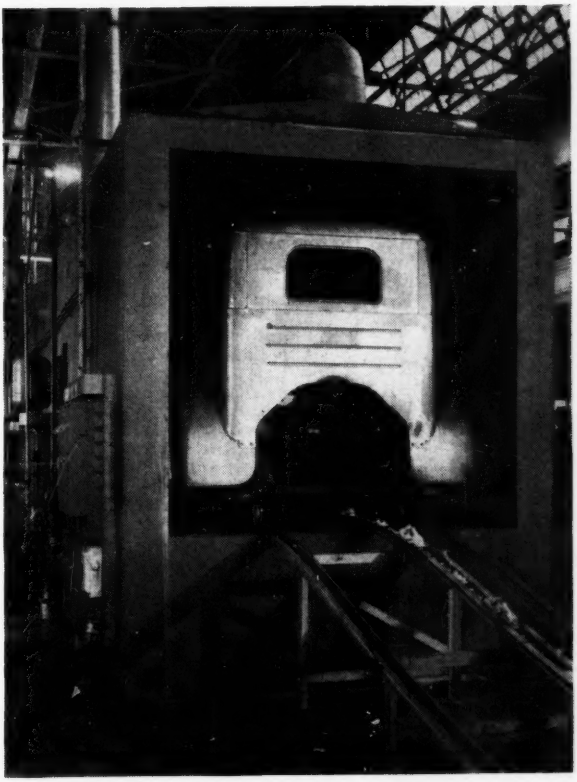

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R. O. Hull

"Factors That Influence Operating Characteristics of Chromium Baths," by J. B. Winters and R. O. Hull, R. O. Hull & Company.

The paper was presented by Mr. Winters. The authors described their experiences in determining the proper operating conditions of chromium plating solutions so that a satisfactory plate could be obtained over the widest plating range. Much of the investigation concerned the deposition of chromium over passive nickel—passivity being used for want of a better term to describe films on nickel. Increased passivity was noted in some cases over nickel which was immersed in the chromium plating solution for a short time before the current was applied. Although a better plating range was obtained over bright nickel than over buffed nickel, excess brightener was cited as a cause of increased passivity. A dip in 5 per cent sulfuric acid and a rinse prior to chromium plating was mentioned as one means of reducing or eliminating passivity, in addition to the various activating dips commercially available for the accomplishment of the same purpose. In their investigations the authors used plating solutions varying from 25 to 60 oz./gal. of chromic acid with sulfate ratios varying from 80 to 120. The Hull Cell was used as a control tool to determine the proper sulfate ratio to secure the widest plating range, in each case varying conditions to secure the result of reduced passivity and increased width of plating range. Since chlorides and silicates also act in a manner similar to sulfate the superiority of the Hull Cell to chemical analysis in controlling a chromium plating solution was mentioned by the authors.

J. M. Hosdowich

"Scratch Hardness and Abrasion Hardness of Electrodeposited Chromium," by J. M. Hosdowich, United Chromium, Inc.

The author, pointing out that hardness means different things to different individuals, described his work performed to connect the appearance of chromium plate with hardness. Converting the microcharacter scratch hardness readings to Brinell, the author showed his experimental results graphically over the range of current density in which chromium plating goes from milky to bright to burnt. The hardness curves, one obtained with an abrasion tester and the other with the scratch hardness tester, showed that the milky chromium deposit is softer than the bright deposit. As the deposit goes from bright to burnt, as a result of increased current density, the scratch hardness increases but the hardness as determined by the abrasion test decreases. Details of the experimental apparatus used for the tests were included.

Ivan C. Hepfer

"Acid Dips for Ferrous Metals," by Ivan C. Hepfer, Furniture City Plating Co.

In covering some of the means used to remove light rust and scale from low carbon steel, the author mentioned both simple immersion and electropickling. Muriatic acid, sulfuric acid, and mixtures of the two are used. Muriatic (hydrochloric) acid acts more quickly and produces a better finish, but causes fumes in the pickling room. Foaming agents can be used for inhibiting as well as fume control, but can cause poor adhesion of the subsequent plate if not rinsed away prior to plating. For electropickling, the author prefers anodic pickling in sulfuric acid.

In the discussion following the presentation, phosphoric acid was suggested as another pickling agent. Also, for vanadium and tungsten steels, alkaline smut removers, such as caustic soda and hydrogen peroxide, or sodium chlorite, to be used after pickling, were suggested. The value of using an activating agent to disperse surface impurities and provide free rinsing was stressed.

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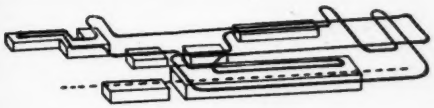

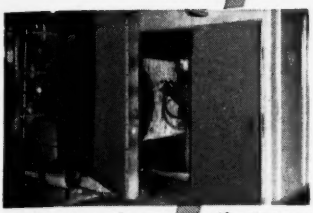

It takes less than one-half minute to spray a wheel or rim in this enclosed water wash spray booth.

Overhead installation of this parts dry-off oven allows for extra working area.

Over and under construction of finish bake ovens relieves factory floor congestion.

1. TRACTOR CHASSIS CONVEYOR (dotted line) travels through spray booths and bake oven.
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3. 135 TRACTOR PARTS per hour move on 1016' Monorail (red line) through wash unit, dry-off oven, spray booth and bake oven.

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Dr. Richard M. Wick

"Prevention of Embrittlement of High-Carbon Steel," by Dr. Richard M. Wick, Bethlehem Steel Company.

The pickling of high-carbon steel must be accomplished without causing embrittlement of the steel, or poor adherence of a subsequent electroplate. Muriatic acid is preferable to other acids, but pickling time should be held to a minimum. Smut formed during pickling may be removed in a reverse current electrocleaner. To secure better adherence, anodic pickling in sulfuric acid for 1 minute or less at 100-400 amp./sq. ft. may be used. Plated objects may be heated for 1 to 5 hours to 300-500 deg. F., either in air or in an oil bath to reduce hydrogen embrittlement to a minimum. For some applications, sandblasting, shot peening, or other mechanical (rather than chemical) means of scale removal may be used.

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"Acid Dips for Copper and Copper-Base Alloys," by B. H. McGar, Chase Brass & Copper Company.

Paper was presented by Frank T. Eddy. Copper alloys may be pickled in hot 10 per cent sulfuric acid. Any red discoloration resulting from the pickling operation may be removed in a hot solution containing 4 to 8 oz./gal. sodium chromate and 10 per cent sulfuric acid. Scale may be removed in a solution containing half nitric acid and half water, or in a solution of 40 per cent nitric acid, 30 per cent sulfuric acid, 1 per cent hydrochloric acid, and 29 per cent water. Bright dips suggested may contain 40 per cent sulfuric acid, 20 per cent nitric acid, and 40 per cent water; or 60 per cent sulfuric acid, 25 per cent nitric acid, ¼ per cent hydrochloric acid, and the rest water (approximately 14¾ per cent). (All acid percentages are per cent by volume.) In a bright dip, to retard the etching action of the hydrochloric acid and reduce foaming, soot can be added in the evening and stirred in well the next morning. Two handfuls of soot to 40 gallons of bright dip were suggested as about the proper quantity.

B. H. McGar

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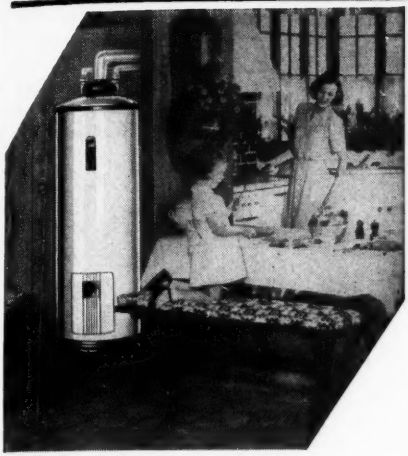
Dwight M. Overcash

"Acid Dips for Zinc-Base Metals," by Dwight M. Overcash, Brown-Lipe-Chapin Division, GMC.

The author compared die cast cleaning and pickling practice of 1938 with that in use today, pointing out how the present trend toward weaker acids follows the development of milder cleaners. Weak acids can be used for pickling since no heavy film, formed in cleaning, must be removed. A survey of the pickling practice in use in 11 large die cast plating companies shows that nine of the eleven use 0.3-3 per cent sulfuric acid for pickling (seven of the nine use 0.5-1 per cent), one uses 5-10 per cent phosphoric acid, and one uses a 0.5-1 oz./gal. solution of citric acid. For automatic plating processes, all of the eleven companies surveyed use a final anodic cleaner, followed by a 10-60 second acid dip, with a 15-30 second transfer period in the cycle.

IRIDITE



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Dr. Fred Keller

"Plating on Aluminum," by Fred Keller and Walter G. Zelley, Aluminum Company of America.

Paper was presented by Dr. Keller. The authors considered plating on aluminum from a metallurgical viewpoint, and brought out the fact that the cleaning and pickling pretreatment prior to the sodium zincate dip influences the character of the zinc deposit, and that pretreatment must be varied for the many alloys (and conditions) to secure the best results. Cleaning and acid treatments for various alloys were reviewed. After a zincate dip of ½-2 minutes' duration, a Rochelle salt copper strike solution with a pH of 10.2 to 10.5 should be used. It is preferable to follow this treatment with a nickel plating operation that will produce a ductile plate. A bright chromium deposit over the nickel has been found to be very effective in increasing the corrosion resistance of the plated aluminum.

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"Cleaning, Acid Treatment, and Plating Upon Aluminum," by Dr. Walter R. Meyer and Steven H. Brown, Enthone, Inc.

Paper was presented by Dr. Meyer, who mentioned a number of cleaning materials for aluminum, and explained that inhibitors of various kinds accomplished their purpose by forming a surface film which may cause trouble in subsequent operations if not removed. Of the acids used to pickle aluminum, hydrofluoric and hydrochloric acids attack the metal much more than sulfuric, phosphoric, or chromic acids. Some acids, such as mixtures of nitric and phosphoric—with or without acetic, brighten and polish aluminum when it is dipped in the acid bath—operated at 210-280 deg. F. for 15 seconds to 10 minutes. Chemically polished and brightened aluminum has the color of silver and a surface which is most active—an excellent condition for subsequent electroplating or anodizing. To maintain the bright silvery appearance, the surface must be anodized—which dulls the brightness somewhat—or lacquered.

Dr. Walter R. Meyer

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Alfred Douty

"Amorphous Phosphate Coatings for Protection of Aluminum Alloys and for Paint Adhesion," by Alfred Douty and F. Palin Spruance, Jr., American Chemical Paint Company.

Paper was presented by Mr. Douty. The authors reviewed several treatments used for the protection against corrosion of both unpainted and painted aluminum. The Alodine process for preventing both surface and underfilm corrosion was described. The process is as follows: alkali clean, rinse, Alodine dip or spray—15 seconds to 3 minutes, (dry without rinsing if surface is not to be painted), rinse in dilute phosphoric or chromic acid held at 100 to 130 deg. F., dry. By means of slides the authors illustrated the results obtained by salt spray tests on a number of painted and unpainted specimens.

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Herbert K. DeLong

"Electroplating on Magnesium and Its Alloys," by Herbert K. DeLong, The Dow Chemical Company.

Mr DeLong described the process of plating on magnesium introduced by The Dow Chemical Company about a year ago. The metal must be cleaned and pickled, after which an immersion zinc coating is deposited in the following solution:

120 gm./l. tetrasodium pyrophosphate
40 gm./l zinc phosphate
10 gm./l. potassium fluoride
5 gm./l. potassium carbonate
Time, 3-5 minutes
Temperature, 175-185 deg. F.
pH, 10.0-10.4
Agitation, mild mechanical agitation.

Following this treatment about 0.0005 inch of copper should be applied from a slightly modified cyanide copper bath. Nickel and chromium, or other metals such as silver, cadmium, or gold, may then be applied.

Dr. John Kronsbein

"Distribution of Electrodeposited Metal on Some Simply Shaped Cathodes," by Dr. John Kronsbein and Lester C. Norton, Evansville College.

Paper was presented by Dr. Kronsbein. In beginning their study of the distribution of plated metal over irregularly shaped cathodes, the authors investigated the effects of radii of different lengths both in recesses and on outside corners. They found that plate distribution is independent of the current density, and that corner effects do not extend more than ⅛ inch or so from the recess; however, there is no plate produced in a sharp corner or recess. An example was cited of silver plated cathodes, on which a satisfactory deposit was obtained in a corner with a radius of 0.044 inch, but no deposit was obtained in a corner with a radius of 0.008 inch. Such data will enable designers to provide products with specifications such that they can be finished satisfactorily.

"Outstanding Problems of Porous Structure in Electrodeposits," by Dr. N. Thon, Princeton University.

Dr. Thon described and illustrated by slides the different types of porous structures found in electrodeposits, discussing the factors associated with such structures. The metal itself, deposit thickness, plating conditions, and condition of the surface on which the deposit is formed are variables in the problem. Measurements of permeability to air and other gases, permeability to cathodic hydrogen, hydrogen occlusion and absorption, and electron diffraction studies of crystal structure were described as being necessary steps in investigating and planning the attack on this problem.

Dr. N. Thon

"The Present Status of Plating Room Waste Disposal," by Dr. Barnett F. Dodge and C. Fred Gurnham, Yale University.

Paper was presented by Mr. Gurnham, who stressed the increasing national and local significance of stream pollution and pointed out that more and more stringent regulations concerning industrial waste disposal are being enacted. Several major waste disposal installations were described and slides illustrating the plants were shown. In general, cyanides can be destroyed by chlorination, acids can be neutralized, alkalies can be acidified, metals can be precipitated, and chromates may be reduced and then precipitated. Sludge can be removed in settling basins. Full automatic neutralization with pH recorder-controllers was described. Equipment for waste disposal is large and expensive, but half-way measures will not accomplish the purpose.

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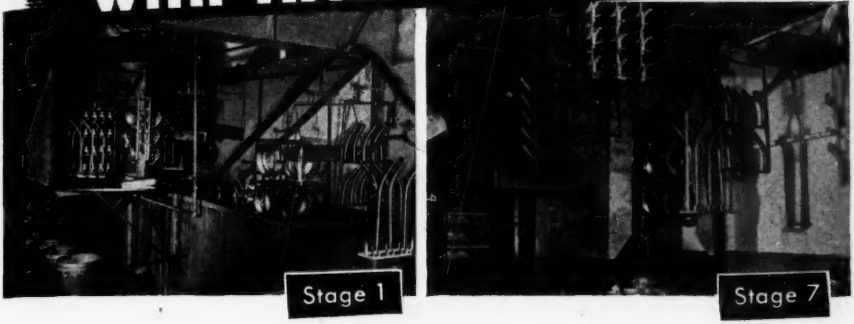

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The Magnus line of metal cleaning machines includes both standard batch units and specially designed machines to fit into your production line.

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THE uses for alkyd resins in the finishing industry have become widespread and varied. This group of resins serves as a major ingredient of both air-drying and baking finishes suitable for inside and outside exposure. The distinctive position of the alkyd resins in the metal product coating field has been attributed to a number of reasons. Severe tests have proved that alkyd enamels exhibit good resistance to water, chemicals, and gasoline. Many forms of commercially available alkyd resin finishes have proved themselves to be outstanding in retention of gloss and color after exposure, and their durability has been found to be excellent. Certain of them show unusual resistance to the destructive effects of ultra-violet light. As a result alkyd resins and their modifications are employed widely as vehicles in both air drying and baking applications.

In a Symposium on Alkyd Resins, presented before the Division of Paint, Varnish and Plastics Chemistry at the 113th meeting of the American Chemical Society, Kenneth A. Earhart, U. S. Industrial Chemicals, Inc., expressed the viewpoint that oil modified alkyd resins will continue to be used in increasing volume in the finishing industry for many years to come. It was emphasized that the endless permutations and combinations possible with

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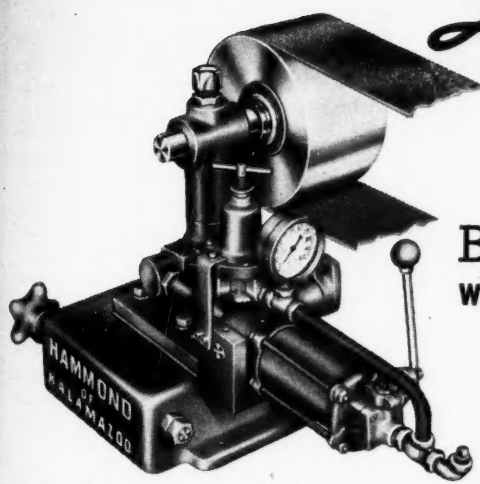

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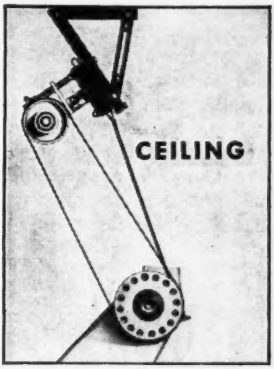

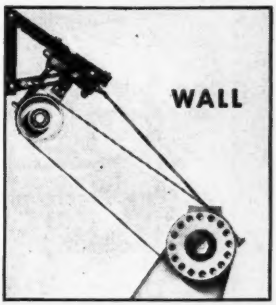

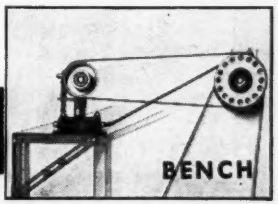

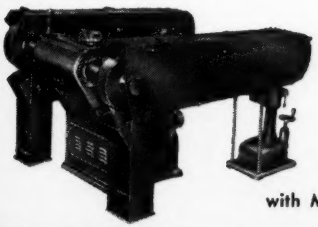

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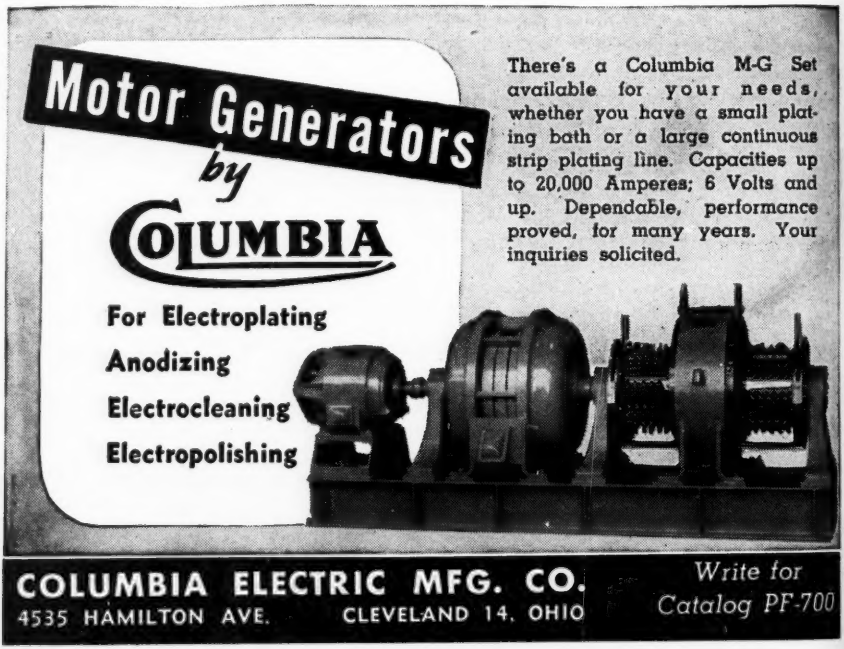
Nature of Alkyd Resins

Alkyd resins are defined as the heat reaction of polyhydric alcohols and polybasic acids. The most common example of such a reaction is that of glycerol with phthalic anhydride, giving rise to the universally used product, glycerol phthalate. When such modifying agents as fatty acids and oils are introduced into the reaction still, before solvent thinning occurs, more universally compatible, modified resins useful in many finishing applications are formed. One point brought out by Earhart at the Symposium is that during World War II, great emphasis was put on the phthalic anhydride content of alkyds, especially those appearing in government specifications. However, he emphasized the fact that phthalic anhydride content does not necessarily guarantee a resin which is infallible with respect to durability and certain other important characteristics, since the preparation of alkyd resins is much more complex than is represented by simple formulas. One reason that the phthalic anhydride content can be misleading is due to the fact that the ratio of phthalic anhydride to the polyhydric alcohol used is an important consideration. Thus, if at any particular oil length, acid or hydroxyl groups are left unreacted in higher than optimum quantities, the alkyd will suffer in one or more important respects. Therefore, the suggestion made by Earhart, was that only alkyds developed carefully and thoroughly tested as to durability and other important properties of the alkyd type should be used in the formulation of finishing materials.

Oil Modified Alkyds

It was pointed out by Earhart that the oils used in preparing alkyd resins are important, and in many cases may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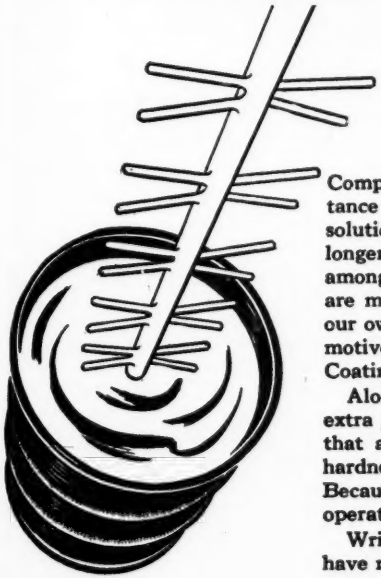

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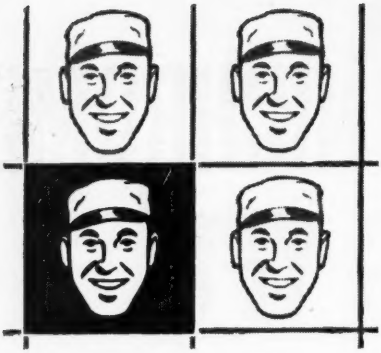

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be decisive components. For example, if an alkyd with moderate drying speed but good color retention is desired, the standards of the industry today are soybean oil modified types, although it was pointed out that other oils, such as sunflower and walnut seed, may be used. However, where fairly fast drying is wanted and color retention is secondary, linseed oil modified alkyds are the standard. Other oils which are used to obtain special properties are castor, dehydrated castor, tung, fish, and coconut.

To understand the important group of oil modified alkyds, according to Earhart, it is necessary to understand the oils and the reactions of drying or, if they do not dry, what polar properties in the oil can be useful in a particular coating composition. There is not as much difference in drying rates between soybean modified alkyds and linseed modified alkyds as would be expected, based on behavior of the oils alone. The reason for this phenomenon is that when oxidation of an oil modified alkyd starts, the fatty acids attach themselves to one another by a mechanism still not clearly understood; but the fact remains that the fatty acid modified alkyd resin molecules are of sufficiently high degree of polymerization that a small amount of cross-linking, by way of oxidation of the fatty acid groups, causes the film to set to a gel-like structure and makes it appear dry long before the final oxidation reactions have been completed. Thus, it can be seen that only a small amount of cross-linking by soybean or linseed fatty acids is necessary to cause incipient gelation of a film. In general, it has been found that the higher iodine number oils or fatty acids dry faster, and produce harder films, higher gloss, freedom from bloom, and high compatibility.

In the case of alkyds which are modified with non-drying oils, the key to the situation seems to be polarity,

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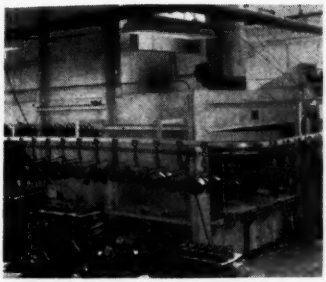

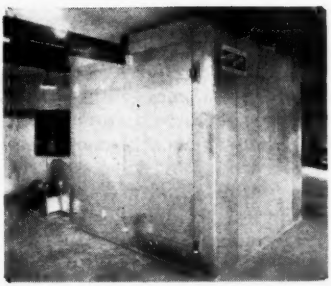

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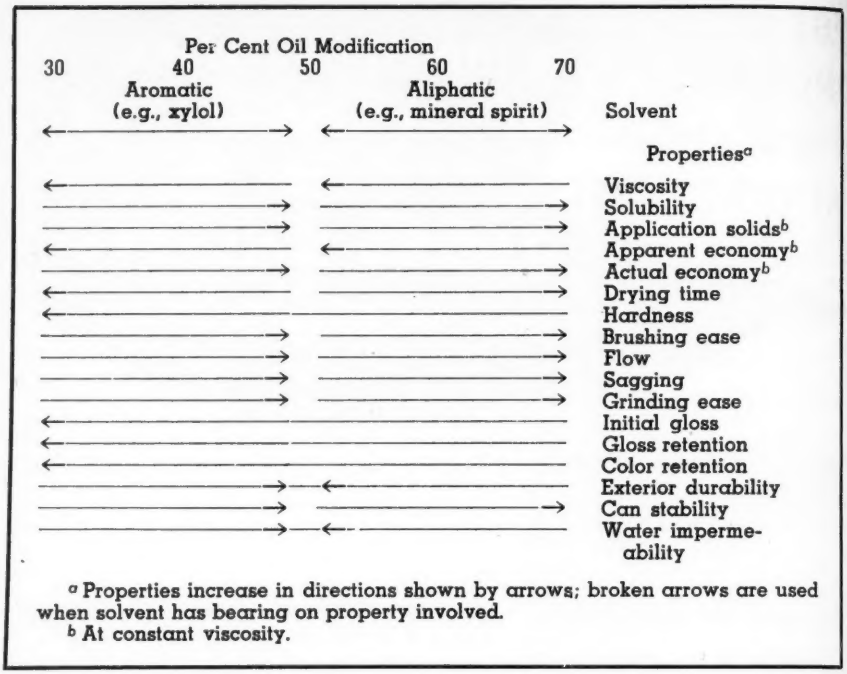

Fig. 1—A general classification of the effect of varying oil modification with respect to various physical properties of drying oil modified alkyds. (*Illustration courtesy "Ind. & Eng. Chem."*)

exemplified by castor oil, or the length of the fatty acid chains, exemplified by the acids in coconut oil. Figure 1, presented by Earhart, shows that, in general, alkyds above 50 per cent oil modification are soluble in mineral spirits, while those below 50 per cent oil modification need aromatic solvents, such as xylene. Thus the solubility of alkyds in any particular solvent increases with the oil length, while the related property, viscosity, decreases with oil length.

Three other important variables which depend on oil modification are application solids, apparent economy, and actual economy. At any constant viscosity in the aromatic or mineral spirit soluble range of alkyd resins the application solids will increase with oil length, while the apparent economy will be proportional to the decrease in oil length because the percentage solids at application will be lower. However, actual economy is proportional to oil length, since less solvent is necessary to produce a film of constant thickness. These statements are, of course, predicted on alkyd constituents costing approximately the same per pound.

With reference to drying time, as already indicated, the drying of oil modified alkyds is dependent on the chemistry of the drying oils—that is, the chemistry involved when the fatty acids of these oils are oxidized. It has been generally observed that drying time increases with oil length when starting at about 50 per cent oil modification—that is, in the neutral spirits soluble range. Below this oil modifica-

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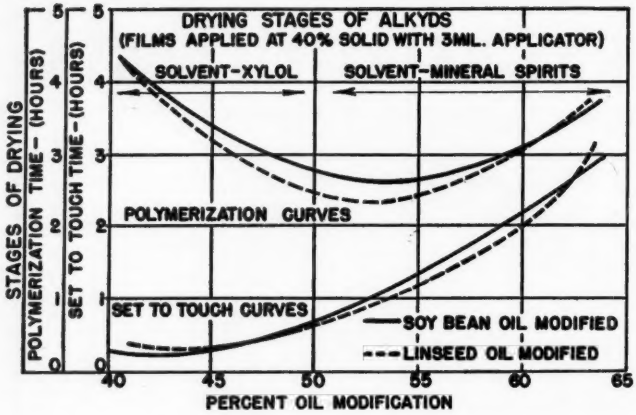

Fig. 2—Illustration of drying stages. Shown is the oil modification vs. two stages in the drying of soybean and linseed oil modified alkyd resins. (*Illustration courtesy "Ind. & Eng. Chem."*)

tion it may be surprising to find indications of increase in drying time as the oil length is decreased. As the oil length of an alkyd decreases, the fatty acid molecules become less in number and farther apart. This means that their chances of causing cross-linking through oxidation becomes less and less. At the same time solvent release becomes more rapid as the oil length is decreased and tends to give the impression of a higher drying speed. This, of course, leads to some confusion as to the meaning of dry in connection with short oil modified alkyds.

This point was clarified by Earhart by pointing out that while shorter oil length alkyds give the impression of being dry, they are actually thermoplastic, in terms of print tests, until oxidation of the oil modification causes sufficient cross-linking to effect a rigid gel structure. It was pointed out that a convenient means of identifying the thermoplastic state is by scratching a film with a knife or spatula; a clean, non-jagged, edge of the scratched film indicates insufficient oxidation to cause gelation. When the threshold of gelation is reached, it will be observed that the sides of the grooves in the scratched film become slightly jagged. The phrase polymerization time was brought out by Earhart to cover the time elapsed until the appearance of the jagged edges. This point is shown graphically in Fig. 2 where the set-to-touch time and polymerization time for a series of oil modified alkyds employing linseed and soybean oil have been plotted.

Earhart stated that the hardness of an alkyd resin film, after it has dried at constant film thickness, is proportional to the amount of glycero' th-late present, and therefore, inversely proportional to the amount of oil modification. Four other properties treated together in the presentation were: brushing ease, flow, sagging, and grinding ease. It was emphasized that all of these properties are dependent on the rheological condition of the alkyd resin. Brushing becomes easier as the oil modification is increased, and as the degree of polymerization or the sizes of the alkyd resin molecules decrease. It was pointed out that flow and sagging are in the same category—that is, in general they increase with percentage oil modification. While grinding ease is proportional to the oil modification, due to the fact that the polymers get smaller and smaller as the oil modification increases, and the fatty acid groups act

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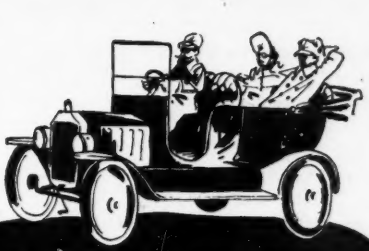

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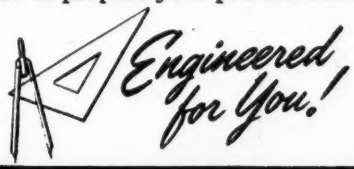

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as wetting agents on the pigments involved, there are also many other contributing factors.

Both initial gloss and gloss retention are, in general, proportional to the glycerol phthalate content, for the same type oil and are indicated by the arrows pointing to the left in Fig. 1. According to Earhart, when using the same oil for modification, the color retention increases with the glycerol phthalate content. Regarding exterior durability, if the application of all types of enamels to all types of surfaces is considered simultaneously, according to Earhart, this property reaches a maximum at around 50 per cent oil modification. Above 50 per cent oil modification, the durability will tend to fall off because the glycerol phthalate content, which is known to be the vital part of the film with respect to durability, decreases in direct proportion to the oil length. However, if a specific surface like phosphate treated steel is involved, and the proper primer used, optimum durability can be shifted below the 50 per cent oil length. With respect to water impermeability, it was stated that data are available which show that this property reaches a maximum at 50 per cent oil modification, as is indicated by the arrow in Fig. 1.

Compatibility

In discussing this property of alkyd resins before the symposium group, Earhart stated that, in general, it is proportional to the polarity of the molecules and inversely proportional to the degree of polymerization. It was pointed out that short chain modified alkyds—for example, those modified with coconut fatty acids have been found to be exceptionally well suited for use with nitrocellulose. Castor oil modified alkyds have hydroxyl groups which are polar in nature and help compatibility.

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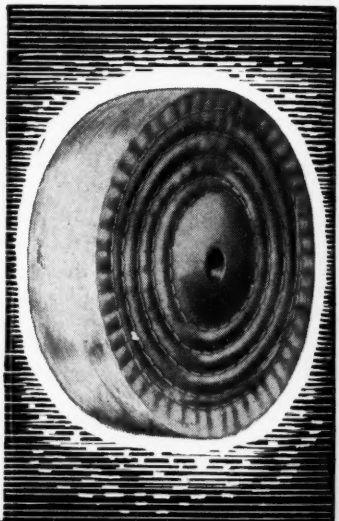

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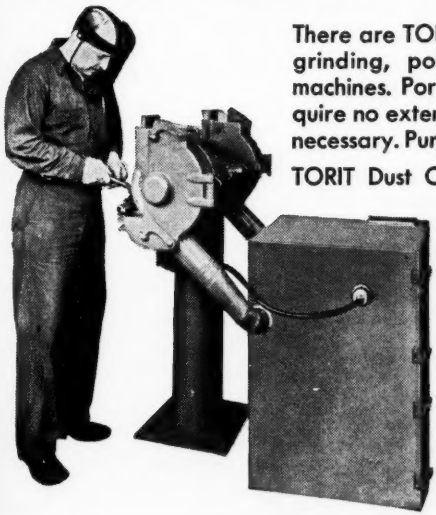

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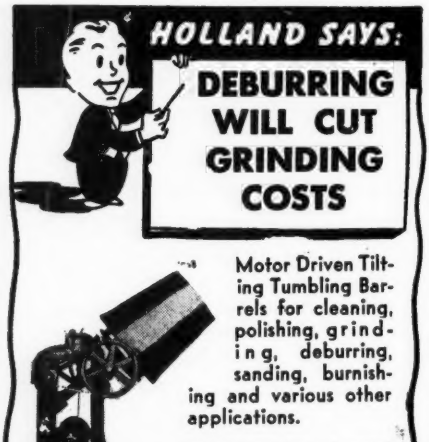
which has a rather linear type of molecule, it was brought out that alkyds with considerable proportion of fatty acid radicals have been found to be the most compatible. Thus, alkyds from around 45 per cent oil length and longer, when dissolved in aromatic solvents have proved compatible. Concerning the compatibility of alkyd resins with oleoresinous varnishes, Earhart brought out the fact that the longer the oil length of the alkyd the better the compatibility, and that 50 per cent oil modification is roughly the minimum. Asphalt compositions were described as compatible with certain alkyd resins; however, in this case the shorter oil length alkyds were recommended.

Development of Alkyd Resins in Finishes

Another feature of the Alkyd Resin Symposium was a discussion of alkyd development and contribution to polymer theory by R. H. Kienle, American Cyanamid Company. In this presentation, it was emphasized by Kienle that successful use of alkyd resins as decorative finishes, made the entire coating composition industry synthetic resin minded. In turn, the examination of all kinds of synthetic resins for finishes expanded the use of alkyd resins. Thus, as pointed out by Kienle, the low water resistance of many alkyd resin films was corrected by a phenolic alkyd resin combination. Likewise, color, mar resistance, hardness and baking cycles were improved by combining alkyd resins with organo-soluble urea formaldehyde and melamine formaldehyde resins. This not only accelerated the commercialization of these resins, but also produced entirely new and improved finishes. One recent development in this direction, which was brought out by Kienle, is that silicone resins have been co-condensed with alkyds leading to new high temperature stable finishes. Thus, reasoning on this basis, the finishing industry can expect further new and improved coatings.

In a discussion of applications for alkyds and polyesters before the Symposium, E. M. Beavers, Rohm and Haas Company, pointed out that in view of the fact that the properties and peformance of these materials can be adjusted over broad ranges, depending on the choice of raw materials employed in their manufacture, uses for the resins in the finishing industry have become widespread. With 38-42 per cent phthalic anhydride, corresponding to alkyd ratios of 49-54, the so-called short oil alkyds are produced. These usually require strong aromatic solvents and have high viscosity. It was pointed out that they are used primarily for baked coatings, and may be combined with such hardening agents as urea or melamine resins, or with nitrocellulose. Because of the relatively small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amount of fatty acid in this type of resin, air drying without baking is usually quite poor, particularly in development of through-hardness. When baked, however, they are characterized by excellent speed of cure, good adhesion, fair to good flexibility, and good durability, color, and color retention. According to Beavers these short-oil alkyds are used in applications such as finishes for Venetian blinds, fast drying finishes for metal cabinets, can and cap coatings, where fabrication and processing of the coated sheet metal are requirements, and in nitrocellulose lacquers.

Medium-oil Alkyds

Another general class of phthalic resin discussed by Beavers is the medium-oil alkyd, based on 30-35 per cent phthalic anhydride, which corresponds to alkyd ratios of 39-45. This type represents probably the most versatile of the alkyds today. At this alkyd ratio, solubility in aliphatic solvents is realized, and viscosities generally are lower than those of the preceding class. The alkyd ratio is high enough to give satisfactory performance in some baking applications, and some of the alkyds will tolerate up to 20 per cent of melamine resin.

Medium-oil alkyds are well adapted either to spraying or roller coating. In baking, the rate of cure is good, although not as fast as that of the short-oil alkyds. Furthermore, the films have been found to develop excellent durability and flexibility. It was brought out that while the color and color retention of these finishes are good, it is generally felt that this property is not as good as for the short-oil alkyds for baking enamels.

An important point brought out concerning the application of this type of finishing material, is that the medium-oil alkyds contain enough drying

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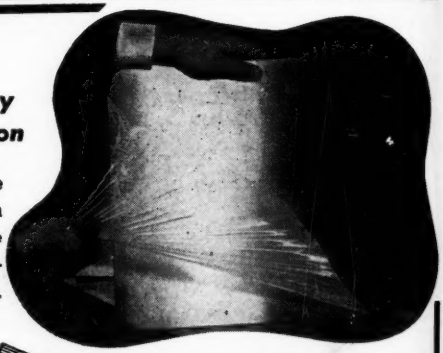

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Yes Sir! Vedoc is the hardest wearing one coat baked finish you can find. High resistance to soaps (storms) and alkalies. Vedoc can be matched perfectly to Porcelain enameled tubs, is long wearing, easily cleaned and provides maximum protection against rust. Baking time is 20 minutes at 300° F—seven minutes with infrared. Vedoc finishes are developed for a specific use, then formulated to fit each customers production setup. Write us of your requirements. We have, or can create, an organic industrial coating that will solve your finishing problem.

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oil, or drying fatty acid component, to provide excellent air drying properties. They set fairly rapidly and develop excellent hardness in relatively short time. The brushing properties vary from fair to good depending on the oils used and the viscosity of the resin. Thus, it can be seen that because of these general properties, the medium-oil alkyd most closely approaches the universal vehicle, and finds wide application for such uses as air drying or baking white and colored enamels, maintenance paints, metal decorating work where flexibility is important, auto and truck refinishing enamels, metal sign paints, and many other applications where adaptability to spraying, roller coating, or brushing is necessary.

Long-Oil Alkyds

According to Beavers the long-oil alkyds constitute a general category utilizing about 24 per cent phthalic anhydride, which corresponds to an alkyd ratio of about 31. These are not particularly adapted to baking, but find wide application in architectural brushing enamels and unpigmented films. They are characterized by good brushing properties and may be formulated to give fast drying, flexible films of outstanding durability, color retention, and gloss retention. Some of this class are particularly adapted to marine finishes. Although, as brought out by Beavers, the field of architectural enamels accounts for a large part of the usage of medium-to long-oil alkyds, they have many other applications, such as metal decorating, where extreme flexibility is required (coating for toothpaste tubes, for example), trim and trellis paints, mill whites and wall coatings.

Non-Drying Alkyds

In continuing his discussion before the Symposium, Beavers also pointed out that non-drying alkyds also find important uses. These resins are

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COLD STRIPPERS

Fast! Economical! Safe! New!

"UNISOL"—for removing all baked enamels! Used cold—Non-inflammable —Non toxic—Strips baked enamels in seconds—Used for all type metals—Requires no rinse—Non-injurious to hands or clothing.

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Samples and further information supplied on request.

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K-P Spiral Woven Wire Conveyor Belts increase production and sting the maintenance bill at the same time because they are backed by superior engineering skill and the accumulated experience of many years.

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Korb-Pettit Spiral Woven Wire Conveyor Belts

"Keeps Promises"

Wire mesh, Spiral Woven Wire Conveyor Belts, Infra-Red Conveyor Dryers, Leather Finishing and Drying Machines, Complete Special Purpose Conveyors designed and Manufactured to Order.

usually based on raw castor oil or coconut oil, with 39-50 per cent phthalic anhydride, resulting in alkyd ratios of 50-65. They are essentially non-oxidizing and non-polymerizing, and must be hardened with some material such as urea or melamine resin, or with nitrocellulose. Despite the fact that these resins are permanently thermoplastic, some of the more recent ones yield finishes of excellent resistance to alkali and acid. The development of color in films from drying oil alkyds is closely related to the degree of unsaturation of the oil. Inasmuch as the non-drying alkyds utilize oils having iodine numbers usually well below 120, their color and color retention are outstanding. It was pointed out that some of the chief applications for the non-drying alkyds is the high quality finishing of refrigerators, stoves, and washing machines, where the ultimate color is essential. Automotive and wood lacquers comprising non-drying alkyds and nitrocellulose enjoy a large demand.

Thus it can be seen that with the successful use and application of the many modifications of alkyd resins in protective and decorative coatings, the entire finishing industry became synthetic minded. The finishing engineer can expect that as other polymers become available, further new and improved coatings will be forthcoming.

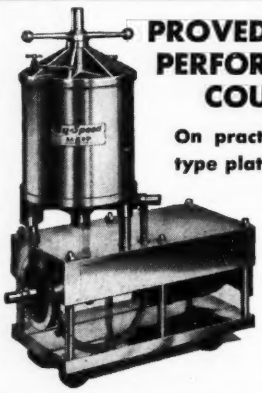
* * *

Rhenium Plating

ONE of the features of interest to platers and finishers attending the meeting of the Electrochemical Society, held in Philadelphia, was a discussion on electroplating of rhenium, presented by L. E. Netherton and M. L. Holt, based on work carried out at the University of Wisconsin. It was reported that there appears to be no difficulty in electroplating bright metallic deposits of rhenium from various types of aqueous plating baths. However, cathode efficiencies in all baths are quite low and change considerably with bath concentration and electrolysis conditions.

Electrodeposited rhenium has a silvery metallic appearance but was reported to tarnish somewhat on standing, particularly in moist air. Rhenium metal gives no apparent reaction with hydrochloric acid and little if any reaction with sulfuric acid. Other workers have reported that electroplated rhenium has a hardness of approximately 250 Brinell.

According to Netherton and Holt, preliminary work on rhenium plating indicated that the sulfuric acid bath and two new baths, a citric acid bath and an ammoniacal citric bath were among the most satisfactory, and the work carried out was limited largely to these systems For the sake of completeness the cathode efficiencies of



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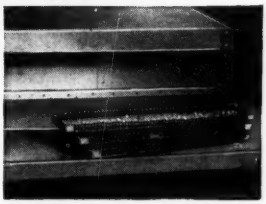

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TABLE I

Cathode Current Efficiencies of Various Rhenium Plating Baths

1 gm./l. potassium rhenate
temperature—158 deg. F.
current density—75 amp./sq. ft.

Bath Addition	pH	Approximate Cathode Efficiency
Citric acid, 50 gm./l.	1.5	0.6 per cent
Citric acid, 50 gm./l. and ammonium hydroxide	10.0	2.0 "
Citric acid, 50 gm./l. and sodium hydroxide	10.0	0.4 "
Oxalic acid, 62.5 gm./l.	0.8	0.3 "
Disodium acid phosphate, 66 gm./l. and phosphoric acid	2.3	0.2 "
Sulfuric acid (to establish)	1.5	5.0 "
Tartaric acid, 70 gm./l.	1.3	0.5 "

other proposed aqueous baths were determined. A modified sulfuric acid type bath has been used for rhenium plating on brass.

Operating Characteristics of Baths

According to Netherton and Holt, probably the most satisfactory bath so far reported for electroplating rhenium is the sulfuric acid bath. It was reported that when this bath contains 10 gm./l. of potassium rhenate and sulfuric acid to a pH of about one, it yields bright metallic deposits and at about 75 amp./sq. ft. and a bath temperature of 158 deg. F. the cathode current efficiency is about 15 per cent. When this bath contains only 1 gm./l. potassium rhenate the cathode current efficiency at the same condition is only 5 per cent. The sulfuric acid bath was found to be particularly sensitive to pH changes. The ammoniacal citrate bath was found to be the best of the other plating baths studied. Although the cathode current efficiency with this bath is quite low, in applications where it is necessary to conserve rhenium salts and where only a thin plate is desired, it may be a useful bath. Table I shows the cathode current efficiencies of the various rhenium plating baths studied. Current efficiencies were determined in all cases at a cathode current density of 75 amp./sq. ft. and a bath temperature of 158 deg. F.

It was pointed out by Holt and Netherton that in studies carried out to determine the effect of potassium rhenate concentration on the cathode efficiency, the amount of potassium rhenate in each bath was varied from 1 to 10 gm./l. The sulfuric acid bath contained enough acid to establish a bath pH of 1; the citric acid bath contained 50 gm./l. of citric acid at a pH of 1.5; the ammoniacal citrate bath contained 50 gm./l. of citric acid and ammonium hydroxide to provide a pH of about 9.5. The temperature of each bath was 158 deg. F.; cathode current density was 75 amp./sq. ft.; the time of each electrolysis run was 15 minutes. The cathode current density used was selected because preliminary results with the Hull Cell showed that this current density gave bright plates with all of the baths. The results of the tests show that the potassium rhenate concentration has a marked effect on the cathode current efficiency of all three baths, and that the sulfuric acid bath has the highest current efficiency. It was reported that all the cathode deposits obtained were bright and metallic in appearance.

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It adds quality to the quality product you build! Bonderite, Parker's corrosion resistant paint base, protects and preserves appearance and serviceability of paint finishes on metal surfaces.

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Studies were also conducted to determine the effect of bath temperature on the cathode current efficiency, wherein bath temperatures were varied from 77 to 194 deg. F. The results show that for each bath the cathode current efficiency increases with increasing bath temperature, reaching a maximum at the highest bath temperature. The sulfuric acid bath exhibited the best cathode current efficiency. As reported for the previous experiment, all the cathode deposits had a bright, metallic appearance.

* * *

Present-Day Concept of Organic Coating Hardness Determinations

A WIDE diversity of opinion exists among organic coating technologists concerning the concepts connoted by the term "coating hardness" and many instruments employing several different principles of operation are in use for reducing the concepts to numerical measurements. This was the finding reported by the Hardness Group of A.S.T.M. Committee D-1 on Paint, Varnish, Lacquer, and Related Products based on a recent survey of 25 manufacturing concerns whose products are such that coating hardness is a matter of consideration to them.

The results of the questionnaire, as reported by the A.S.T.M. Hardness Group, brought out the fact that hardness tests are quite generally employed. Indications are that about an equal number of laboratories employ scratch hardness tests as employ pendulum tests; indentation hardness measurements are less used. Furthermore, it was brought out that a large number of different methods are employed to determine scratch hardness, and many laboratories use more than one method; the use of the Sward Rocker pre-

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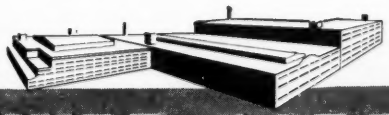
Hupp's Experimental Engineering Laboratory can show you how to cut finishing costs. Just send samples of the parts to be processed along with a finished part. Write today! There's no charge or obligation.

Hupp Manufactures a Complete Line of Tumbling Barrels and De-Burring Machines.



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dominates in the determination of pendulum hardness. Some special methods for hardness measurement are employed for specific purposes.

The returned A.S.T.M. questionnaires indicated that a large variety of different methods are being used in industry to assess that property of organic coating films, rather loosely designated as hardness. Ten different methods of determining what was designated as scratch hardness were reported. These methods are as follows: (1) fingernail; (2) Hoffman Hardness Tester; (3) Bell Laboratories Hardness Tester; (4) du Pont Hardness Tester; (5) hand knife; (6) hand pencil; (7) Microknife; (8) Taber Shear Attachment; (9) Wilkinson Pencil Hardness Tester; and (10) Modified Bell Laboratories Hardness Tester.

According to the survey, only two methods were reported for determination of pendulum or entropy hardness. These were the Sward Hardness Rocker and the Walker-Steele Swinging Beam. The laboratories employing indentation hardness tests indicated preference for two test methods, namely, Pfund and Print Resistance.

It is generally agreed throughout the finishing industry that there is a need for a standard method for conducting hardness tests; however, it is likely that more than one standard method will be required. In none of the methods now used for measuring hardness is the result given the dimensions of an absolute physical quality.

One report to the A.S.T.M. Hardness Group, based on practice at the Western Electric Company and Bell Telephone Laboratories, states that determinations of mar resistance, or the ability of an organic coating to resist surface scarring and scratching, such as may occur in fabrication or use of coated parts, is carried out by moving a coated test specimen beneath a needle point which is increasingly loaded until the surface of the film is ruptured. It is evident that many properties of organic coatings contribute to film surface character. Eventually it may be useful to distinguish the various characteristics by descriptive names to avoid the confusion which usually arises when hardness is discussed.

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Outstanding

1. **Adhesion to metal surfaces**
2. **Resistance to sulfur tarnish**
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Pale in color. Takes 100-200% reduction. Dries under 15 minutes.

A premium product—priced at ordinary lacquer levels.

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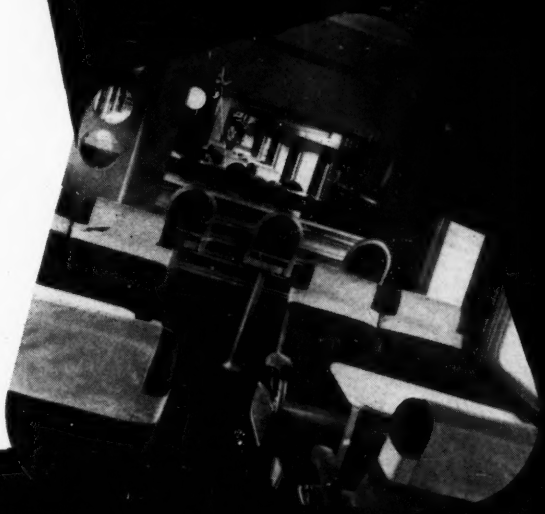
"Simple Methods for Analyzing Plating Solutions" is the title of a 28-page illustrated booklet available from the Hanson-Van Winkle-Munning Co., Matawan, N. J. The seventh edition, the booklet contains the latest methods for analyzing plating solutions, and is the outgrowth of H-VW-M experience in developing these procedures which are most useful. The operations have been numbered for convenience and each standard solution has been given a symbol to correspond to the symbol that designates the particular method of analysis. No chemical symbols are employed, but the name of each chemical is given in full. Volumetric analytical methods are used exclusively because they are sufficiently accurate and simple to follow.

that aid in appearance and utility

The Buhl Pocket Microscope used for surface inspection is made from brass shapes, machine and centerless ground to a satin finish and finally finished on a buff using a greaseless compound prior to nickel and chromium plating.

(Photo courtesy Buhl Optical Co., Pittsburgh 12, Pa.)



The walls, ceilings, and bulkheads of the grill coach illustrated herewith have been fabricated from aluminum and painted with Pratt and Lambert Vitrolite Semi-Gloss Enamel. The door frames, basket rack edging, light frames, counter stools, and fluted counter front have been fabricated from aluminum and anodized.

(Photo courtesy American Car and Foundry Co., New York 8, N. Y.)

PRACTICAL APPLICATIONS *of Modern Products*

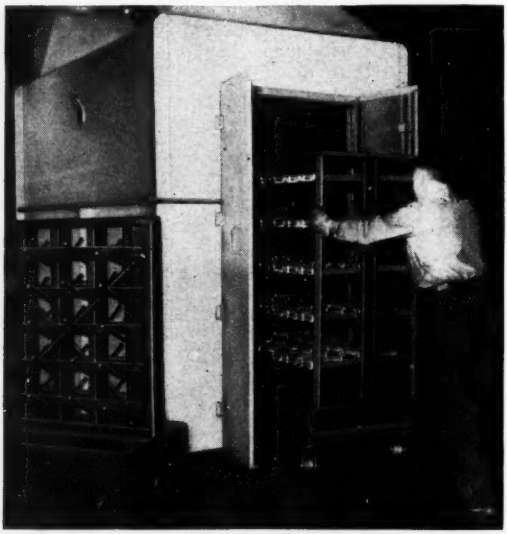
Alvey-Ferguson Rack Washer Assures Clean Racks for Finished Gears

A NEW method of rack cleaning has recently been adopted at the Warner Gear Div. plant of Borg-Warner Corp., Chicago. The company manufactures precision gears for automotive transmissions and uses hundreds of caster-mounted racks for transporting gears from place to place through the plant. A rigid requirement in this building system is that finished gears be carried to the assembly area on thoroughly cleaned racks.

In the past, definite days for rack cleaning were scheduled. Dirty racks were allowed to accumulate, and, on the specified days, they were taken outside the plant and cleaned by hand. Many man-hours were required to make certain that a sufficient number of clean racks would always be available since approximately one hundred or more clean racks are needed each day.

Process engineers at the plant sought a faster, more efficient method of rack cleaning and, with the assistance of Alvey-Ferguson enginers, were able to find the solution to their problem. An automatic A-F Rack Washer was recommended and installed, and the results have been highly satisfactory.

The washer, which may be seen in the accompanying illustration, is completely enclosed; it is located inside the plant near a trucking aisle; and it is a pit-type installation for easy access at the floor level. The operation of the unit is so simple that no permanent operator is required; instead, each trucker is responsible for placing a soiled rack in the washer when-



Gear racks are cleaned in Alvey-Ferguson rack washer.

ever a clean one is removed. After the exchange of racks is made, the doors of the washer are closed, a button is pressed to start the washer, and the rack is cleaned automatically. The washer is set on an automatically timed, three-minute wash cycle; and, when the washing is completed, the unit shuts itself off. The high pressure oscillating wash mechanism of the washer permits even the most stubborn grease and dirt, including cutting oil, metal chips, and grinding dust, to be stripped away.

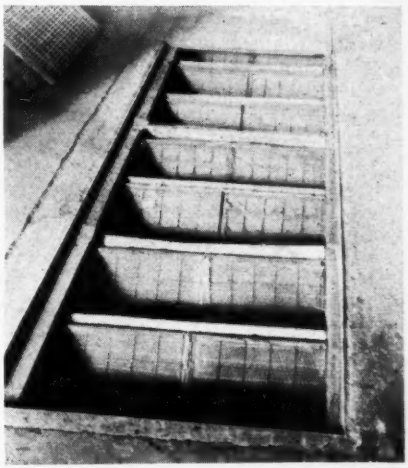
Since the installation of this convenient, in-the-plant rack washer, substantial savings in time and effort have been realized. Racks are now cleaner, and they may be washed at any time by simply placing them in the washing unit and pressing a button to start the operation.

Air Filters Reduce Fire and Health Hazards in Spray Painting

WITH the aid of R-P Self-Seal air filters with snap-in grids, manufactured by the Research Products Corp., Madison 10, Wis., engineers at Meili-Blumberg, New Holstein, Wis., solved the problems of removing objectionable material from incoming air and filtering paint out of the exhaust air in their paint spray areas.

In this operation, the directional pull of exhaust air is eliminated by the down-draft system. Removable 8-filter sections containing R-P Self-Seal filter units are mounted in a pit (see accompanying illustration) covered by a heavy duty grating to support the many tons of Meili-Blumberg equipment. An exhaust fan, connected to the pit by an underground duct, draws air from the paint spray area down through the grating and filters, into the pit, and finally expels it.

Thus, contaminated air is drawn down and away from the operator, enabling him to breathe fresh, clean air at all times. Also, the down-draft system prevents expelled air from depositing paint spray on ducts, blower blades, housings, louvers, and other equipment; and when residual paint is



View of pit in plant of Meili-Blumberg with grating removed to show filter units for filtering objectionable material from incoming air and filtering paint out of exhaust air in paint spray area

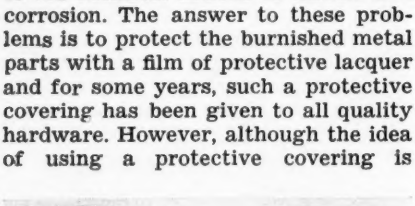
trapped by the filters, it cannot settle on workers' cars and neighboring buildings.

Improved Clear Lacquer Protects Hardware Parts

"THAT NEW LACQUER" is the name which has been given to a new lacquer developed for Sargent and Company of New Haven, manufacturer of home hardware. The research program which resulted in the development of this new lacquer has extended over a period of almost two years, during which time a great many different lacquers have been listed in

the company's laboratories.

Although locksets, cupboard hardware, window hardware, and the like are made of metal which ought to last a lifetime, it is all too often necessary to replace these hardware items due to the chemical actions of tarnish and corrosion. The answer to these problems is to protect the burnished metal parts with a film of protective lacquer and for some years, such a protective covering has been given to all quality hardware. However, although the idea of using a protective covering is



Two doorknobs which have been subjected to a continuous salt-spray. The knob at the right is coated with That New Lacquer; the knob at the left is coated with the best of the old lacquers.

sound, the results have not always been entirely satisfactory.

A hardware lacquer, to be truly effective, must protect the metal from moisture, cleaning fluids, chemical fumes, and the salts and acids of human perspiration; and it must be able to withstand bumps and scratches and constant abrasion.

In August of 1947, Sargent and Company decided to try to find a "perfect" lacquer, and a set of so-called impossible" specifications was drawn up. Fifteen suppliers were contacted, and the process of submitting samples for tests was initiated. The program was carried on over a period of many months until finally a synthetic lacquer meeting most of the specifications was found. The research was continued for a few weeks more until the few minor remaining faults were eliminated, and the final formula, the 119th on the list of lacquers tried, was claimed to be a complete success.

The new lacquer is now being produced in quantity to be used on all Sargent products. Some of the characteristics of the lacquer include the facts that once the lacquer is baked on, it defies chemical analysis and it cannot be dissolved by any standard paint remover or lacquer thinner—not even its own thinner. Cleaning fluids have no effect upon the lacquer, nor does human perspiration.

The lacquer may be subjected to a salt-spray for hundreds of hours or to a concentrated sulfuric atmosphere for thousands of hours before there is even pinpoint penetration. The doorknob shown at the right in the accompanying illustration is proof of this fact; it has been subjected to a continuous salt-spray for 150 hours, and the finish has remained smooth and unmarred. In contrast, the doorknob shown at the left has been coated with the best of the old lacquers and subjected to a salt spray for just 17 hours.

The resistance of the lacquer to impact, abrasion, and bending is such that repeated blows with a one-pound hammer swung on a 12-inch arc produces no break, and a metal which is covered with the lacquer may be bent and rebent until it is broken without the lacquer cracking or wrinkling.

Such a protective coating on hardware parts permits the original finish to be retained indefinitely and prolongs the service life of the parts.

Power Brushing Being Used by Vacuum Cleaner Manufacturers for Finishing Operations

VACUUM cleaner manufacturers, who sell a form of power brushing to their customers, are themselves

Semi-automatic Osborn brush installation is shown being used to finish vacuum cleaner extension tubes.

●

becoming increasingly important brush customers. New methods of power brushing are being used by vacuum cleaner manufacturers for reducing the fabrication costs of their products. A leading Ohio manufacturer in the industry, for example, has been able to cut the unit cost of extension tubes, which it supplies with its kit of cleaner appliances, by using a semi-automatic machine in combination with Osborn Monitor wire brushes. A view of the equipment, which is manufactured by the Osborn Manufacturing Co., Cleveland, may be seen in the accompanying illustration.

Eight 12-inch wire brushes, which are mounted in the machine, are used to finish the metal extension tubes to a rich, lasting satin luster. The time required for the brushing operation is nine seconds per tube, and this method is appreciably faster and more economical than the former method used, according to the manufacturer. The machine is electrically operated, and the brushes are rotated at a speed of 1,725 r.p.m. One set of brushes may be used to finish more than 200,000 tubes. After the brushes may no longer be used for tube finishing, they may be used in other departments to brush small castings by the off-hand method.

Power brushes have been used for quite some time in the manufacture of vacuum cleaners for such operations as gear deburring and finishing and polishing small parts. In cooperation with Osborn research engineers, several of the manufacturers in the industry have been able to establish new brushing methods which have increased brush life and speeded up the brushing operations. The development and adaptation of automatic and semi-automatic machinery has made possible greater uniformity of results from the brushing operations. The quality of the results are no longer largely dependent upon the skill of the worker; the use of machinery in applying the brushes to the work, or the work to the brushes, has eliminated, to a great extent, the factor of human error.

Foxboro Bulletin No. 427. In an attractive 32-page bulletin, The Foxboro Co., Foxboro, Mass., presents its complete line of Dynalog instruments for process measurement and control, as well as the various auxiliary devices which adapt these instruments to their many different industrial applications. The bulletin explains the all-electronic Dynalog principle of operations, provides details of the simple but sturdy construction of the instruments, and advises as to the choice of resistance type or EMF type instruments under varying conditions of installation and use.

NEWS of the Industry

NEW PLANTS

The purchase of a three-and-one half acre tract of land in Englewood, Colorado, a Denver suburb, as the proposed site of a new **C. A. NORGREN CO.** plant has been announced by Carl A. Norgren, president of the Denver firm.

The Norgren Company manufactures pneumatic products, such as air line lubricators, filters, regulators, valves, hose couplings and assemblies.

No definite date has been set for starting construction of the new plant.

THE CAMBRIDGE WIRE CLOTH COMPANY has erected an additional bay at the home plant in Cambridge, Maryland.

The 18,000 square foot addition was built especially to house the Company's wire fabrication department. New and modern machinery has been installed to provide more extensive facilities for this department. Included are squaring shears, bending brakes, ring and circle shears, calendarizing rolls and roll forming equipment. In addition, Cambridge now has complete equipment for all types of welding, including electric arc, oxy-acetylene, heliarc and spot welding.

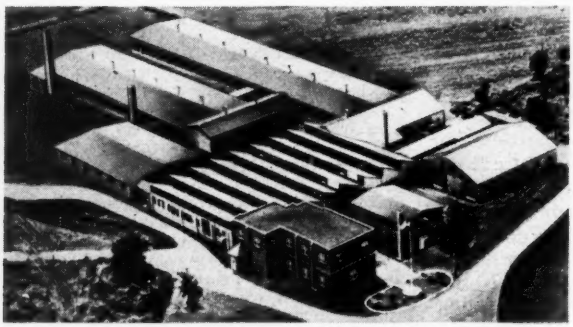
Cambridge products, other than wire fabrications, include industrial grades of wire cloth and woven wire conveyor belts.

THE TORIT MANUFACTURING COMPANY is adding a sheet metal fabricating department to its main plant in St. Paul, Minn. Work is nearly finished in the consolidation and rearrangement of the other departments to make room for this new manufacturing division, and the installation of brakes, shears and other equipment was completed in mid-July.

To gain additional room for these expanded operations, Torit also is constructing an addition to the plant for the storage of oxygen and acetylene cylinders handled by Torit's welding equipment and supply division, St. Paul Welding and Manufacturing Company.

When these changes are completed Torit will be doing its own fabrication of the cabinets for its dust collecting equipment. These were formerly made to Torit specifications by another St. Paul firm. It is expected that these changes will speed up production and improve deliveries of these machines.

In addition to dust collecting equipment for



View of enlarged plant of the Cambridge Wire Cloth Company, Cambridge, Maryland

grinders, polishing machines, and so on, used in industrial plants throughout the country, Torit manufactures dental supplies and equipment. The new department will facilitate fabrication of certain dental items as well.

COMPANIES

The Sturgis Products Co., Sturgis, Michigan, producer of Roto-Finish materials, equipment and processes for mechanical finishing, has changed its corporate name to the **ROTO-FINISH COMPANY,** and moved all sales and manufacturing to its new plant in Kalamazoo, Michigan. This change affects the name of the company only. Organization and company structure remain the same.

Roto-Finish, the copyrighted trademark, was incorporated in the new name because it is widely known in industry and is more descriptive of the company's operation.

WORTHINGTON PUMP AND MACHINERY CORPORATION, Harrison, N. J., has announced the expansion of the Water Treating Equipment Sales Division and the transfer of that division to the corporation's Dunellen Works at Dunellen, N. J.

The products involved in the transfer are hot process water softeners of both deaerating and non-deaerating types; cold process slurry type softeners and coagulators; zeolite softeners including deionizing systems; and pressure filters for general purpose filtration.

THE CAMBRIDGE WIRE CLOTH COMPANY, Cambridge, Maryland, has appointed two agents to distribute its line of woven wire conveyor belts to Canadian manufacturers.

The R. D. Travers Company, 25 Houston Street, South, Hamilton, Ontario, will cover the city of Hamilton and the Niagara Peninsula.

The Process Equipment Company, 1440 St. Catherine Street, W., Montreal, Quebec, will represent Cambridge in the entire province of Quebec.

THE ELECTRO-CHEMICAL SUPPLY AND ENGINEERING CO. of Paoli, Pennsylvania, announces a complete reorganization. The new officers and key men aggregate approximately a century of experience in the acid and corrosion proofing field. In addition to existing facilities, a new plant with 16,000 square feet of floor space is being fully equipped at Emmaus (Allentown) Penna.

Dr. C. R. Payne

The officers of the company are: Dr. C. R. Payne, president; J. Wm. Grant, vice president and sales manager; Wm. A. Sesher, treasurer and production manager; Walter L. Sheppard, Jr., is advertising manager and export sales manager.

The Electro-Chemical Supply and Engineering Co. was founded in 1912, and was one of the first companies in the United States established to manufacture acid-proof cements, and to engineer acid-proof construction.

NEW POSITIONS

Ralph M. Johnson, vice president in charge of sales, Norton Co., Worcester, Mass., announces the following changes in territory assignments:

HENRY A. BLESSING, former Chicago field engineer, has been appointed abrasive engineer responsible for a new territory, with headquarters in Des Moines, Iowa.

MYLES A. SNYDER, of the Worcester sales engineering department, has been appointed Chicago field engineer under Arthur S. Rakestraw, district sales engineer. **DAVID H. PAUL,** also of the Worcester sales engineering department, has been named abrasive engineer in charge of a new territory, with headquarters in Memphis, Tennessee.

ARTHUR F. WIRTZ, JR., and GEORGE L. WIRTZ, JR., grandsons of the late M. F. Wirtz, founder of the firm, have joined The Atlas Mineral Products Company, being assigned to supervision and sales departments respectively at Mertztown, Pennsylvania.

A. O. Thalacker, vice president and general manager of Detrex Corporation, manufacturer of equipment and chemicals for production cleaning in industrial plants and dry cleaning establishments, has announced the following advancements effective immediately.

R. A. EMMETT, JR. has been made a special assistant to the general manager to supervise material control, production scheduling, inspection, and safety.

J. DOYLE HAMACHER has been made superintendent of the equipment manufacturing plant. He will also retain his previous title and duties as company plant engineer.

BORIS SWAY has been elected president of the Texo Corporation, Cincinnati, Ohio, it was announced at the annual meeting of the Board of Directors. Sway, who has played a prominent part in the research concerning and development of detergents, has been vice-president in charge of production at Texo since its inception several years ago.

Prior to his association with Texo, Sway acted as consultant in the production of surface active chemicals for maintenance and processing in all branches of industrial and institutional activity. During the war he served as counsel for certain government agencies. He is a graduate in Chemical Engineering, University of Cincinnati.

Boris Sway

DON BERTKE was elected vice-president at the meeting. Bertke announced that several new products are soon to be introduced.

SPENCER L. HENN has joined the staff of United Chromium, Incorporated as field sales and service engineer for the New England area. He will provide technical service to chromium plating clients of United Chromium and will also sell and service the complete line of Unichrome products and processes including rack coatings, stopoffs, copper, dips for zinc and cadmium and strips.

Spencer L. Henn

Mr. Henn is a graduate of Yale University with a Ph.D. in Chemistry. Since his graduation he has served the finishing industries of Connecticut and Massachusetts as a representative of Apothecaries Hall Company. He is well known in this territory for having developed metal cleaning and buffing materials and for servicing and installing equipment and processes for plating zinc, cadmium, bright copper, bright nickel, and chromium.

CHARLES W. BLACKETER has been appointed to the new post of manager of customer service for the Stamford, Conn., branch of the Atlas Powder Company's Industrial Finishes Department, it has been announced by G. B. Work, general manager of the Department.

Mr. Blacketer was formerly Chief Chemist for Berry Brothers in Detroit and had previously been with the Sherwin-Williams Development and Research Laboratories for 13 years in Chicago. He had also been engaged in promotional sales activities with the Diamond-Alkali Company in Painsville, Ohio.

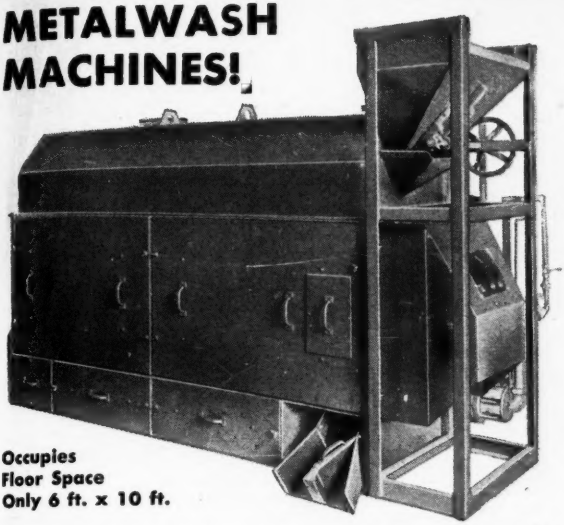
A native of Nebraska, Mr. Blacketer studied at the University of Chicago. He is a member of the American Chemical Society, the American Society for Testing Materials and the Federation of Paint and Varnish Production Clubs.

HONORS

VAN M. DARSEY, president and **WALTER R. CAVANAGH,** Development Laboratory manager of Parker Rust Proof Company, Detroit, received the Sam Tour Award at the annual meeting of the American Society for Testing Materials at Atlantic City.

This award is made each year by ASTM to encourage research on the improvements and evaluation of corrosion test-

Unmatched Records of METALWASH MACHINES!

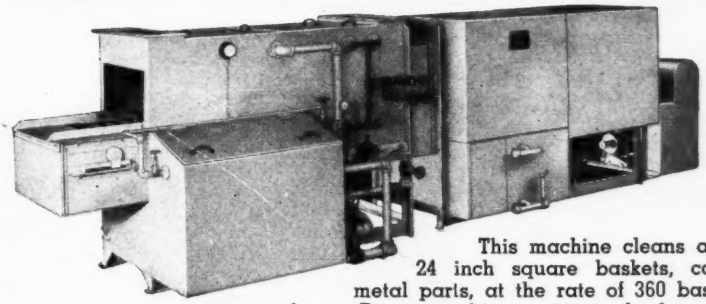


Occupies Floor Space Only 6 ft. x 10 ft.

Ten Tons of Screws — WASHED — RINSED — DRIED in this Machine in 8 hours!

This Return-type Machine is ideal for handling screw machine products, stampings, slugs, cups and similar parts. Chips, cutting oils and shop dirt are automatically removed, quickly and thoroughly. Automatic feeder simplifies handling. Loads and discharges at same end for one-man operation.

This Conveyor-Type Machine — WASHES — RINSES — DRIES 360 Baskets per hour!



This machine cleans and dries 24 inch square baskets, containing metal parts, at the rate of 360 baskets per hour. Removes chips, cutting oil, shop dirt and drawing compounds. Ideal machine for processing castings and machined parts and small parts in baskets.

If You have a Cleaning, Pickling or Drying Problem, Let us help solve it.

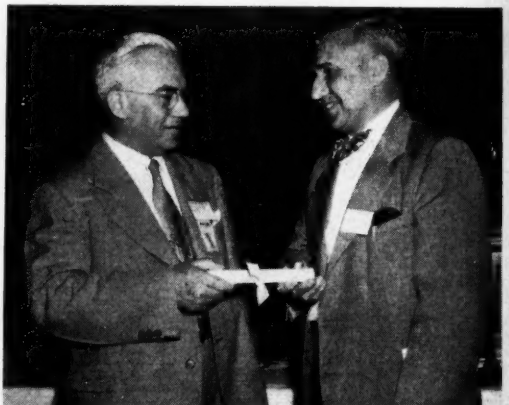
METALWASH MACHINERY CORP.
149 - 155 SHAW AVENUE IRVINGTON 11, NEW JERSEY

Van M. Darsey (left), Walter R. Cavanagh

ing methods and to stimulate preparation of technical papers in this field. It was presented to Darsey and Cavanagh for their paper, "Apparatus and Factors in Salt Fog Testing," which presented findings of recent research carried on in the Parker Rust Proof Company laboratories in accelerated testing of metals and finishes by the salt spray test.

THE SCHENECTADY VARNISH COMPANY was presented a certificate commemorating 40 years of membership in the American Society for Testing Materials at the annual luncheon of the Society, held at Haddon Hall in Atlantic City on Tuesday, June 28th.

Raymond Henry Thielking, technical director of Schenectady Varnish, acccepted the certificate for the Schenectady, New York concern. The presentation was made by R. L. Templin, president, on behalf of the Society. The luncheon affair was for the combined membership of the Society, in connection with its annual convention.



Richard L. Templin, president of the American Society for Testing Materials, Aluminum Company of America, Pittsburgh, Pa. (at left) presents certificate in recognition of 40 years' service to Raymond H. Thielking (at right), technical director of Schenectady Varnish Co., Schenectady, New York

The Schenectady Varnish Company, founded in 1904, has consistently contributed to the purposes of the American Society for Testing Materials, developing methods for testing and evaluating both raw materials and finished products. This work has constantly set and maintained improved standards in American Industry.

TRAINING COURSES

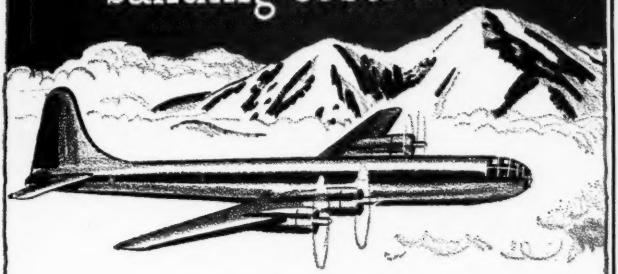
Educating foremen, supervisors, salesmen, jobbers, and business executives instead of the workmen in spray painting methods and equipment is the unique feature of the Spray Painting Equipment School recently opened by the **BINKS MANUFACTURING COMPANY,** with classes composed of men with allied interests.

These classes are held during the first full week of each month, except December, at the company's plant from 9 to 4, Monday through Friday. The classes are limited to twelve so that the members may get the maximum benefit from personal instruction and discussion.

Under the supervision of William Beecham, a nationally known paint chemist, spray painting authority and writer on industrial finishing subjects, the students acquire a complete knowledge of manufacturing methods and operations, and receive an exceptionally thorough course in the construction and operation of spray guns. Class members

(Continued on page 102)

Up in the air over sanding costs?...

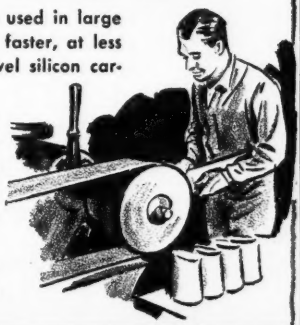


...try JEWEL ABRASIVES

The sleek stainless steel skin used in large quantities for aircraft is finished faster, at less cost, with specially designed Jewel silicon carbide paper belts.

Aluminum alloy castings are finished more efficiently in a major aircraft plant with Silver Streak belts. Like all Jewel belts, they have AP's exclusive smooth-running Velvet Joint.

Remember, there's a Jewel product for every sanding, polishing and grinding need.



Abrasive Products, Inc.

SOUTH BRAINTREE 85, MASSACHUSETTS · MAKERS OF JEWEL COATED ABRASIVES

ABRASIVE PRODUCTS, INC. JEWEL ABRASIVES SOUTH BRAINTREE, MASS. U.S.A.

There's a JEWEL ABRASIVE for Every Polishing and Finishing Need

BELTS
DISKS
SHEETS
SPECIAL SHAPES
Cloth, Paper, Fibre or Combination Backing

BUY THROUGH YOUR INDUSTRIAL DISTRIBUTOR

Porcelain enamel buildings can now be cleaned, polished, and waxed in one operation with a new cleaner-polish which is said to be highly resistant to rain-streaking. The new cleaner is a powder put up in easy-to-handle carboard boxes, and can be used for any smooth, hard surface, such as chromium plate, glass, tile, and wood, as well as for porcelain enamel.

A special utensil for cooking asparagus has been designed. Fitted with an easy-to-lift, perforated porcelain enameled rack which holds the asparagus over boiling water, the new cooker is equally useful for steaming corn, broccoli, or spinach. Porcelain enameled throughout, the covered container holds 6 quarts, is 11 inches long, 7¼ inches wide, and 5¾ inches deep.

Above—Members of a Binks Spray Painting Equipment Class learn about modern equipment for the application of flock from Instructor William Beecham. The school is completely equipped with every item of equipment for the application of any type of finish.

Below — A member of the Binks Spray Painting Equipment school adjusts his spray gun to produce a perfect spray pattern. Then he learns how to apply a full even coat of paint. As a part of the curriculum, each member is provided with a spray gun, which he takes apart, reassembles and demonstrates.

also get a thorough acquaintance with automatic spray finishing machines in the Binks research department.

Binks Spray Painting Equipment Classes are conducted without charge to the individual, except for transportation and expenses while in Chicago. Application should be made two weeks or more in advance to E. F. Watts, Binks Mfg. Co., 3118-40 Carroll Ave., Chicago 12, Illinois.

Gathering at the Hotel Carter, Cleveland, Ohio, for the second Annual Ferro Furnace School, conducted by **FERRO ENAMEL CORP.**, 36 porcelain enamelers participated in discussions concerning all phases of continuous and box furnace operation as well as operation of other equipment in the enamel shop.

A panel of speakers led by Elmer W. Dany, Ferro chief engineer, covered such subjects as Furnace Maintenance Costs, Radiant Tubes, Temperature Gradients and Furnace Atmosphere, Combustion and Controls, Instrumentation, Refractories, Recuperators, Drying of Enameled Ware, Mill Room Maintenance, Spray Booth Maintenance and Pickle Room Maintenance.

Graduates of second Annual Ferro Furnace School

Assisting Mr. Dany were E. W. Weaver, ass't. chief engineer, Surface Combustion Corp., C. E. Sladky, North American Mfg. Co., S. R. Illes, Hays Corporation, W. H. Henson, manager, sales engineering, Norton Company and Harry M. Brown, sales manager, Patterson Foundry & Machine Company. P. S. Gruber, B. L. Gamble, R. C. Dickey and M. Bozsin of the Ferro staff also led discussions on various phases of the program.

At the conclusion of each lecture the floor was opened to discussion affording an opportunity for the "students" to ask questions, air plant problems, and profit from each other's experiences.

A "Short Course on Corrosion" has been scheduled for September 12-16 at the University of Texas, Austin. Sponsored by the **NATIONAL ASSOCIATION OF CORROSION ENGINEERS,** Houston, the course is directed principally to persons in industry who must deal with corrosion problems, but who have not had the experience or background to do so efficiently.

Applications for official registration blanks may be obtained from A. B. Campbell, executive secretary, National Association of Corrosion Engineers, 905 Southern Standard Bldg., Houston 2, Texas. Registration fee is $20.

SOCIETIES

THE NATIONAL PAINT, VARNISH AND LACQUER ASSOCIATION'S Industrial Finishes Division Steering Committee, Advisory Board, Lacquer Committee, National Industrial Finishes Committee and Wood Finishes Producers Group held a joint meeting at the Edgewater Beach Hotel in Chicago recently.

President Joseph F. Battley welcomed the members of these important groups and Joseph A. Hager, chairman, presided. Harry E. Stone, chairman, Lacquer Committee and Norman W. Kelley, chairman, Wood Finishes Producers Group also participated.

A committee was appointed to cooperate with the Advertising Production Subcommittee. This will include O. J. S. deBrun, chairman, Dr. G. Klinkenstein and Clarence Slocum. Ray Hill, advertising sales director of the Association, made a graphic presentation of the industry national advertising program and explained how it would benefit everyone within the industry.

Papers were presented covering "Selling Quality Finishes" and "A Code of Ethics for the Industry."

John C. Moore, director of the Scientfic Section, spoke on "Procedure for Developing Control Testing Methods." H. E. Post reported on "Improving Customer Relations."

MEETINGS

A three-day clinic on the maintenance of industrial instruments has been scheduled by the **INSTRUMENT SOCIETY OF AMERICA** for September 9-12 in the Statler Hotel, St. Louis.

The clinic will be held in advance of the Fourth National Instrument Conference and Exhibit, sponsored by the Instrument Society of America, in cooperation with six allied societies and associations.

NECROLOGY

EDWARD C. GREENSTREET, eastern district manager for Chicago Vitreous Enamel Product Company, passed away June 15.

Mr. Greenstreet was well known throughout the industry having been in the porcelain enamel field for many years. He had been associated with Chicago Vit since 1937 as a service engineer.

SAMUEL ALSOP, SR., president of the Alsop Engineering Corporation, since its inception thirty years ago, and holder of numerous patents, died July 7th at his summer home at Madison, Conn.

Born at Delaware Water Gap, Pennsylvania, Mr. Alsop was a New York Electrical School graduate. He showed inventive talents at an early age, and at 24, patented his first filter and organized the Alsop Engineering Company the same year in New York City. The concern moved to Milldale, Connecticut in 1930.

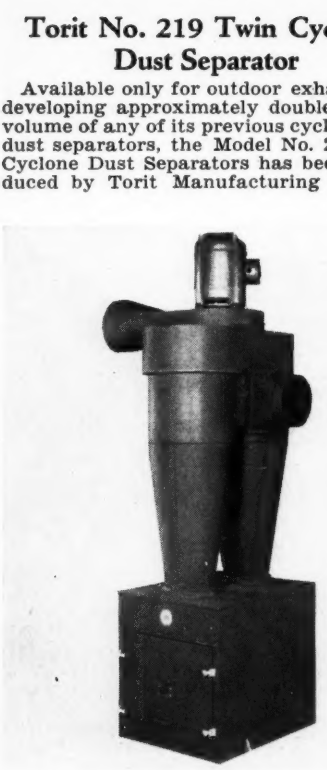
Mr. Alsop built the firm from a one-man shop into an enterprise that employs 130 people and maintains offices or representatives in every major city in the United States and in South America and Europe.

He continually expanded the company's manufacturing facilities and line of liquid processing equipment which now includes filters, mixers,, pumps and stainless steel tanks.

New • EQUIPMENT • MATERIALS • PROCESSES

Torit No. 219 Twin Cyclone Dust Separator

Available only for outdoor exhaust and developing approximately double the air volume of any of its previous cyclone type dust separators, the Model No. 219 Twin Cyclone Dust Separators has been introduced by Torit Manufacturing Co., 314 Walnut St., St. Paul 2, Minn. The Model 219 incorporates two cyclone separators of the same size used in Models Nos. 18-FM and 19-FM. As shown in the accompanying illustration, the cyclones are mounted on a common bottom reservoir which has a 20 x 28½ x 15½-inch high pull-out drawer with a capacity of approximately 4½ cubic feet.



Torit No. 219 Twin Cyclone Dust Separator

The unit is equipped with a 5 h.p., 3,450 r.p.m. end-mounted motor (motor starter included) and an 8-inch inlet and 10-inch exhaust outlet. It develops 2,100 c.f.m. with a velocity of 6,000 f.p.m. at a static pressure of 3 inches.

Dimensions of the Torit No. 219 Twin Cyclone Dust Separator are: 90 inches high x 35 inches wide x 29½ inches deep overall. Floor space required: 24 x 30 inches height; from floor to inlet, 59½ inches; and height to top of collector, exclusive of motor, 72 inches.

Antarox Synthetic Detergents

Two new, non-ionic synthetic detergents—Antarox A-400 and Antarox A-480—introduced recently by Antara Products, General Aniline & Film Corp., 444 Madison Avenue, New York 22, N. Y. are said to be effective in many different detergent applications.

The fact that these two new detergents of the aromatic polyethylene glycol ether type are practically odorless makes them particularly valuable for the specialized demand made upon detergents today, the manufacturer states.

Antarox A-400 and A-480, because of their ether structure, are extremely

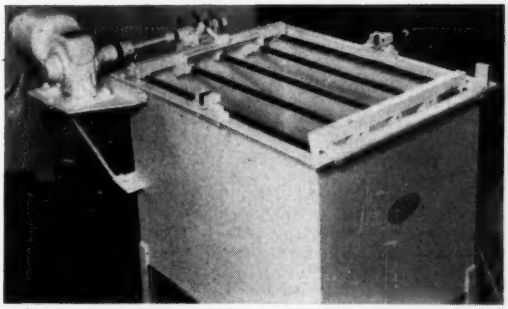


Fig. 2 — Double-Duty Plating Machine converted for still tank plating

stable in the presence of acids, alkalis and electrolytes. Because they do not ionize, they will not form insoluble compounds in hard water. They do not easily decompose or separate. Their physical and chemical properties will not change over long periods of storage. They also are said to be capable of withstanding wide variations in temperature.

Double-Duty Plating Unit

The Daniels Plating Barrel and Supply Company, 129 Oliver Street, Newark 5, New Jersey, has announced the development of a new and versatile plating machine. This machine incorporates all the desirable features of the standard Daniels Type OLS Plating Barrel, and yet the unit may be used for still tank plating on a production basis. Pictured here is the Daniels double-duty plating machine. The unit is so designed that the standard cylinder and framework is completely removable and becomes adaptable for still tank plating by placing a rack with a cathode rod or, if desired, a double cathode rod and an anode rod over the tank. The still plating rack is so designed that when securely in position all electrical connections are fast, thus eliminating the necessity of rewiring or moving bus bar.

The unit is more versatile when double cathode rods may be agitated. Units can addition of cams to the drive shaft, the cathodes rods may be agitated. Units can be furnished with steel tanks, rubber-lined steel, or stainless steel; and cylinders can be fabricated from bakelite, hard rubber, or boilable lucite as pictured here.

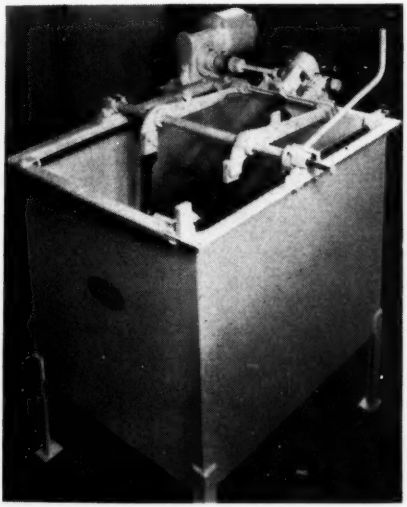


Fig. 1—Daniels Double-Duty Plating Machine rigged as a plating barrel

DULAC Dull Black Lacquer Enamel L-433

A new and special air drying coating has been developed for machine tool finishes by the Maas & Waldstein Co., Boston, Chicago, Los Angeles, and Newark, manufacturer of industrial finishes.

The new finish, known as DULAC Dull Black Lacquer Enamel L-433, is made especially for wrenches and other cast iron, steel or aluminum machine tools, and is said to produce an extremely tough coating that hides surface flaws and imperfections in the metal when applied by either the spray or dip method.

Lor-Ann Combustible Gas Detector and Safety Controller

The Lor-Ann Combustible Gas Detector and Safety Controller for plant protection, manufactured by Lor-Ann Instrument Co., Inc., 58 Montgomery St., Jersey City, N. J., has just been approved by the Underwriters' Laboratories. The Lor-Ann has also received the approval of the

Associated Factory Mutual Fire Insurance Co.

In operation, the Lor-Ann Combustible Gas Detector continually samples and analyzes plant atmosphere where combustible gas accumulations produce a fire or explosive hazard. When gas accumulation approaches a dangerous volume, an automatic alarm, both audible (bell and / or siren) and visible (neon signal light) is given, and at the same time the Lor-Ann automatically takes over control of the plant's operating machinery, fire-fighting system, ventilation system or both depending upon the plant's particular protection requirements.

The "brain" of the Lor-Ann Combustible Gas Detector and Safety Controller is contained in an air-tight and dust-proof control cabinet mounted on a self-supporting steel panel which also houses a heavy duty, rotary vane, forced feed lubricated, suction pump from which tubing leads to the gas analysis cells or "remote heads" which are placed at the danger points. The remote heads are designed to be placed at any distance from the main control panel, the analysis taking place in the gaseous area and being instantaneously "telegraphed" to the control panel.

The alarm point setting is variable and can be set at from 20-100 per cent of the lower explosive limit for any given gas. A wide-faced meter gives a constant reading of gas concentrations. The Lor-Ann operates on 110 volts, 60 cycles, a.c., and is provided with a 3-wire grounded neutral protective system.

In addition to the automatic gas warning signals the Lor-Ann is fitted with a separate fool-proof signalling system to indicate both visibly and audibly any failure of the instrument to operate.

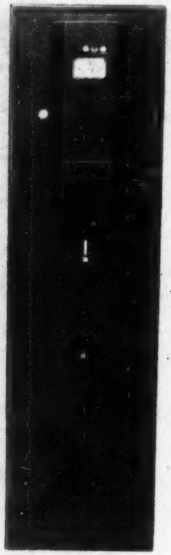


FIG. 1.

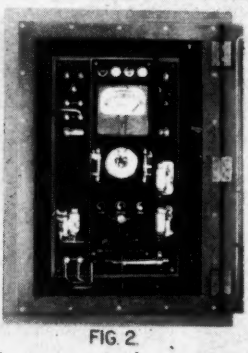


FIG. 2.

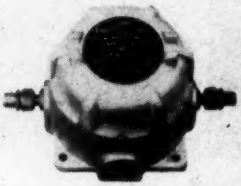


FIG. 3.

Fig. 1 — Lor-Ann Industrial Type Combustible Gas Detector — front view. Fig. 2—Cabinet Interior showing Lor-Ann Control Chassis. Fig. 3—Lor-Ann Gas Sampling Analyzer Head.

"Metalast"

A new type of protective coating system for metals was explained recently by C. E. Raabe, president, C. A. Woolsey Paint & Color Co., 229 E. 42nd St., New York, N. Y.

Called the "Metalast" system of painting, it is applicable to all metals to resist all types of corrosion, fouling and abrasion, the manufacturer states. Based on vinyl and other plastic resins, it is able to withstand exposure to a wide range of acids, chemicals and salts for long periods of time.

Applicable to steel, aluminum, galvanized iron, ferrous and non-ferrous alloys it has adhesive and abrasive resisting qualities that resist chipping or peeling despite the roughest treatment. In addition, the Metalast system has protected ship bottoms and other submerged surfaces for two years of continuous immersion even in tropical waters where fouling and corrosion are most severe. This special anti-fouling coating completely eliminates the marine menace of salt water growths and sea ravages which plague all sea vessels.

Its quick drying properties—it dries on metals in less than twenty minutes—enable almost uninterrupted application on the metal with a minimum lay-up time. Unaffected by temperatures up to 200 deg F., it can be applied in atmospheric temperatures ranging from 5 deg.

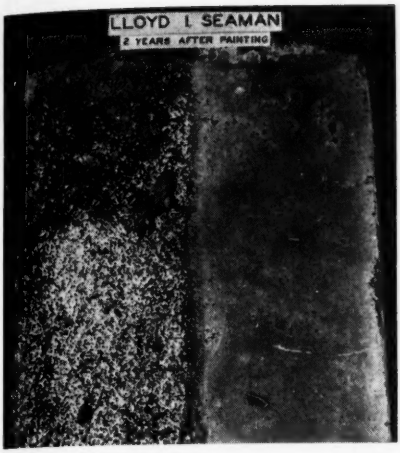


Photo of rudder of Hospital Ship Lloyd I. Seaman, two years after painting. Left half not coated with Metalast; right half protected by Metalast.

F. to 90 deg. F. Metalast finishes, when applied, possess among other qualities absence of odor, taste, and toxicity; extreme chemical inertness, excellent toughness and flexibility; non-inflammability; good clarity; and a remarkable resistance to age and weathering.

The application of the Metalast system is comparatively simple. Metal surfaces are cleaned free of old paints, oil, grease and loose rust; then Metalast is applied by brush or spraying.

First a washcoat primer is applied as a single coat that serves as an anchor for subsequent coatings on the metal. Then there is applied a Metalast anti-corrosive which provides a tough barrier coat with tight inner coat adhesion and which is highly resistant to exterior corrosive elements. Finally, a Metalast top-coat which varies with desired color and usage is used to complete the coating.

Paint Spray Outfit

A low-cost spray outfit designed for use in shops having compressed air available has been announced by Decora Manufacturing Company, 1516 Park Ave., Emeryville 8, Calif. The outfit consists of the new Decora spray gun, a new air transformer unit, and 25 ft. of air hose with connections.

The new gun is available either as an internal-mix pressure-feed cup gun for spraying paints, enamels, synthetics and similar materials, or as an external-mix syphon-feed cup gun for shellacs, lacquers and fast-drying materials. The gun is suitable for use with a pressure feed paint "pot" or tank.

The air transformer includes an efficient jet type separator-filter to remove oil and moisture, an accurate pressure regulator, and inlet-pressure and regulated-pressure gauges. The unit will operate on any air line pressure up to 200 pounds.

Sly "Purair" Helmet

For the protection of sandblast operators against the inhalation of even the finest dust, as well as for protection against rebounding abrasive, The W. W. Sly Manufacturing Co., 4700 Train Ave., Cleveland 2, Ohio, is offering its "Purair" Helmet. Extremely light (5½ lb.), with nothing to tie or bind around the neck, it supplies a constant flow of purified air that lessens fatigue and promotes good workmanship, the manufacturer states.

Other features include its wide range of vision and freedom of head movement. All metal parts are of aluminum. The one-piece flexible hood is made of high-grade rubber which is easily cleaned with soap and water or a suitable antiseptic.

Sly "Purair" Helmet

Solka-Floc Filter Aid

A filter aid approved for use with the du Pont High Speed Copper Plating solution is available under the trade name Solka-Floc from Brown Company, 500 Fifth Avenue, New York 18, New York.

To comply with du Pont recommendations, this aid is precoated from aqueous slurry and then washed in place in the filter by circulation of hot water for about one hour prior to contact with the plating solution.

Further details on the use of Solka-Floc with copper, silver, nickel, tin, chromium, and other plating solutions may be obtained from Brown Company Technical Service Department, or from most filter equipment manufacturers.

Model ST-1 Still and Degreaser

A combination 5 g.p.h. still and degreaser identified as the Model ST-1 has been placed on the market by the Phillips Manufacturing Co., 3438 Touhy Ave., Chicago 45, Ill. The unit is electrically heated and contains two compartments. The first compartment is heated with strip heaters and boils the solvent, the vapors flowing over to the second compartment where they are condensed by a small cooling coil. A thermostat is provided in the boiling sump to prevent overheating in case of excessive contamination.

The Model ST-1 can be used as a degreaser by immersing the parts in the agitated boiling sump and then holding them in the vapor area to rinse and dry. Said to be an excellent auxiliary to larger degreasing equipment, the unit measures 3 inches long x 17 inches wide x 40 inches high overall and can be used with either trichlorethylene or perchlorethylene. The inside dimensions of each compartment are 14 x 15 inches with 11 inches of working depth.

Model ST-1 Still and Degreaser

Farm Machinery Enamels

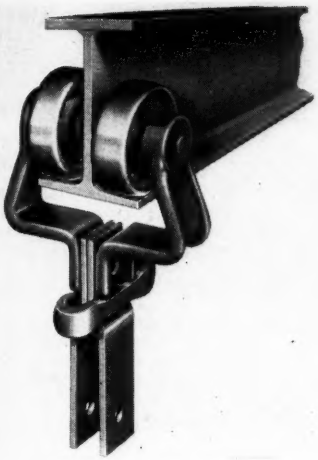
A complete line of farm machinery enamels which may be applied over previously painted surfaces and used for touching up spots before applying them as finish coats has been announced by the Pittsburgh Plate Glass Co., Paint Division, Pittsburgh 22, Pa. The enamels provide a tough film which is resistant to weather, rust, grease, and oil, and are available in black, red, gray, green, orange, and yellow to match the shades of original paint coatings of major farm equipment manufacturers.

Webb "Junior" Overhead Conveyor

Designated as the "Junior," a specially designed overhead conveyor for light work has been developed by the Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Michigan.

The conveyor travels on a 3-inch Junior I-beam held by bolted brackets attached either to supporting angles or tie rods. The manufacturer states that the entire structure is very light and can be hung from the average plant ceiling.

Trolleys, chain, and attachments are strong and light but simple in design and construction. No. 228 chain in the 2-inch pitch size is used. It can be assembled or disassembled without special tools. Drop forged from high strength steel, the chain has an ultimate strength



Webb "Junior" Overhead Conveyor

of 8,800 pounds and a recommended chain pull limit of 400 pounds, which the manufacturer points out to be very conservative. Loads may be placed at various intervals, depending upon the clearance required by the loads used.

Trolley brackets are constructed of high carbon steel and wheels are provided with anti-friction bearings for maximum ease of operation. Load-carrying hooks and carriers are available in a wide variety of types. The Junior Conveyor can be arranged to carry parts through complete finishing operations. In installations of this type conveyor loops for drying or cooling can be made in very little space by reason of the fact that horizontal curves may be made as small as 18 inches in diameter. This and other features of the conveyor make possible excellent plant layouts in a minimum of manufacturing space.

Totrust

Totrust, a combined rust-inhibitive paint primer and finish coat, now has major improvements of deeper penetration, high gloss, and tougher weathering, according to the manufacturer, The Wilbur & Williams Co., Greenleaf & Leon Sts., Boston 15, Mass. Through extensive research in rust penetration, Totrust has been designed to get into the rusted pits and inhibit rust at its source to control further corrosion.

Available in five shades and zinc chromate and aluminum, it has a coverage of 800 to 1000 square feet per gallon.

"Krylon" Plastic Coating

Designed to reduce the number of steps usually required to prevent rust and corrosion on metal stampings such as camera and radio parts, a transparent and durable plastic coating known as "Krylon" is announced by the Black-Ox Chemical Co., 171-177 Oraton St., Newark 4, New Jersey.

The coating, which has the effect of a "baked-on" finish, is said to resist tearing and show no tendency to pull off when coated parts are placed on the agitating conveyor after dipping. Stampings can be handled in two minutes after coating, it is claimed, and the material is said to harden in five minutes, with parts ready for shipment. Large parts can be pulled apart without causing holes after being coated with Krylon, since the material hardens evenly and firmly to any surface to which it is applied, the manufacturer states.

According to the manufacturer, Krylon will undergo a temperature range of from

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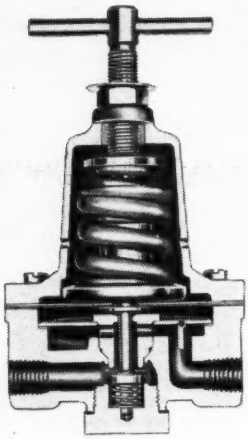


Cutaway view of Norgren Relieving Type Pressure Regulator

70 degrees below zero to 225 degrees above without cracking or peeling. The film is also said to be resistant to dilute acids, alcohols, and alkali, as well as chemical fumes, grease, oil, and water. Krylon can be applied by several different methods, such as spraying and brushing, in addition to dipping.

Norgren Relieving-Type Pressure Regulator

Positive protection against "creep" is one of the features of the Norgren Relieving-Type Pressure Regulator, product of the C. A. Norgren Co., 222 Santa Fe Dr., Denver, Colo., which is suited for use on lines carrying air or non-corrosive gases and such fluids as oil, cold water, and so on, for line pressures up to 400 p.s.i. and working pressures up to 250 p.s.i.

Relief valve action is simple and positive. The lower spring rest, containing the valve opening, pivots on a ball-end valve pin. The relief valve permits downward adjustment of pressure without "bleeding" the line and is an extra safeguard against damage to parts due to pressure surges.

Easily installed and simply maintained, the regulator is available for pipe sizes from ¼ to 1 inch. All parts subject to wear are hard chromed.

Flexible Abrasive

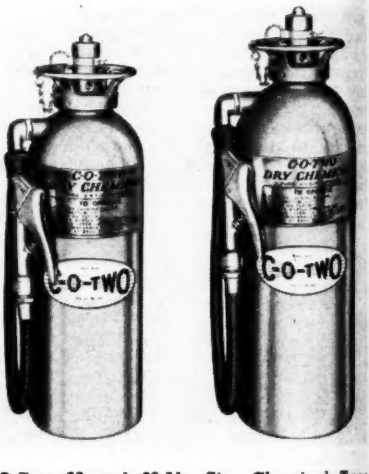
A new abrasive for cleaning and polishing metals has been announced by Ideal Industries, Inc., 4004 Park Avenue, Sycamore, Ill. This new abrasive consists of a fine grain abrasive material held together by a flexible bond and molded in stick form.

In production and machine shops, the Ideal Flexible Abrasive removes tool marks, scratches or rust leaving a highly polished finish on copper, brass, bronze, iron, steel, aluminum and other metals.

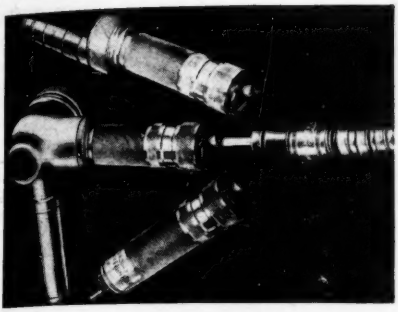
Ideal Flexible Abrasive is made in five sizes from ⅜ inch x ½ inch x 5 inches to 1 inch x 4 inches x 5 inches.

C-O-Two Dry Chemical Type Fire Extinguisher

The C-O-Two Fire Equipment Co., P. O. Box 390, U. S. Highway 1, Dept. PF, Newark 1, N. J., has recently completed development of its dry chemical type fire extinguisher, which is a self-contained unit having no extra gadgets protruding, or complicated operating instructions.



C-O-Two 20 and 30-Lb. Size Chemical Type Fire Extinguishers



Wyco Quick-Change Handpieces

The unit contains a dry chemical which is free-flowing, non-conducting, non-corrosive, non-freezing, and non-toxic, and is claimed to be highly effective on flammable liquid and electrical fires.

The C-O-Two Dry Chemical Type Fire Extinguisher is available in 20 and 30-lb. capacity sizes.

Quick-Change Handpiece

For use with its standard flexible shaft machines, Wyzenbeek & Staff, Inc., 825 W. Hubbard St., Chicago 22, Ill., is offering a quick-change handpiece under the Wyco trade name which is designed for snap-on-and-off connection. The handpiece includes a sliding sleeve which locks four steel balls in an annular groove, thereby allowing the handpiece to swivel but not to be unintentionally disconnected. For safety reasons, two hands are required to operate the unlocking sleeve. All parts of the handpiece, which is available in straight or angle spindle designs, are made of heat-treated steel and cadmium plated.

Pennsalt Cleaner Z-54

A new, improved cleaner for reverse current cleaning of zinc base die castings prior to electroplating has been developed by The Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.

The new product will be marketed by Pennsalt's Special Chemicals Division under the name of Pennsalt Cleaner Z-54. It is composed of carefully balanced, anhydrous alkaline ingredients plus a combination of synergistic surface active agents. Usually, Z-54 is employed after a proper pre-cleaning operation such as spray washing, emulsion cleaning, or vapor degreasing.

Recommended concentration for Pennsalt Cleaner Z-54 is five ounces per gallon. Improved cleaning is achieved because solution temperatures may average between 180 and 190 deg. F., it is claimed. Substantial reduction in blistering has been reported by initial users of the product.

Greater current carrying properties and use at higher temperatures combine to make Pennsalt Z-54 highly effective in producing chemically clean surfaces, the manufacturer states.

"Coatingage"

The "Coatingage," an instrument for measuring the thickness of non-magnetic coatings on iron and steel, has been announced by Branson Instruments, Inc., 436 Fairfield Ave., Stamford, Conn. Measurements are said to be made rapidly, without damage to the coating, and the thickness is indicated directly on the meter of the instrument. Two concentric scales cover a range of 0.0001 to 0.50 inch. The lightweight, self-contained battery

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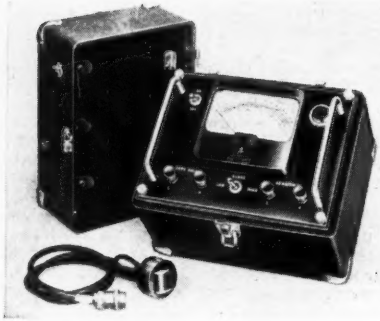

"Coatingage"

power supply permits use of the instrument in the field, laboratory, or on the production line.

Typical applications for the Coatingage include the measurement of the thickness of paints, enamels, metal plating, protective coatings, scale or coke deposits. Thickness readings are within 10 per cent of the actual thickness.

Plastic Work Apron

A plastic work apron with electronically sealed edges is being marketed by the Forbes Products Corp., 625 S. Goodman St., Rochester 7, N. Y. Available in standard sizes of 24 x 36 and 34 x 44 inches with cotton or plastic neckbands, the apron is claimed to be extremely tough, resistant to water, alcohol and acids, and flameproof. It can be obtained in transparent, black, or white colors and may be readily cleaned with a damp cloth.

Forbes Plastic Work Apron

Arco Spill-Proof Unbreakable Acid Container

A closed type unbreakable container for carrying acids, alkalies, and other corrosive solutions without danger of spilling is now available in 1, 3, and 5-gallon sizes, according to the manufacturer, Automotive Rubber Co., Inc. 8601 Epworth Blvd., Detroit 4, Michigan.

Fig. 1 — Swatch of rubber covered perforated steel shows how rubber completely covers the metal and how coatings are wedded through the holes.

Fig. 2 — Arco Spill-Proof Unbreakable Acid Container

The Arco Spill-Proof Unbreakable Acid Container is constructed similar to the other solution handling utensils, with perforated steel shell sandwiched between ⅛-inch coatings of seamless rubber or synthetics, according to need. Inner and outer coatings are tied through with perforations for permanent adherence, and leave no metal exposed. Both carrying and tipping handles are covered, and rubber stoppers are included for the top and the spout.

PRODUCT LITERATURE

H-VW-M Bulletin 106 presents conveniently and briefly the characteristics of the Matawan Cleaners for effective metal cleaning.

"Heiline News," Vol. 2, No. 1, published by the Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11, Ohio, is devoted to acid and alkali-proof lined pipe, fittings, and fume ducts, and the service available from the company.

"Rohco Platers Pointers." Volume 1, No. 1 of its eight-page illustrated booklet, outlining means available for conserving chromic acid, is available from R. O. Hull & Co., Inc., 1278 W. 3rd St., Cleveland 13, Ohio.

Herold Rotary Power-Driven and Other Brushes for cleaning and polishing are pictured and the standard sizes and numbers provided in Catalog 48 available from The Holland Manufacturing Co., 3927 Clark Ave., Cleveland 9, Ohio. Shop accessories are included.

Instructions for the Use of Unichrome Air-Dry Rack Coating 203, an improved coating material developed by United Chromium, Incorporated, 51 E. 42nd St., New York 17, New York, for insulating plating and anodizing racks, are available in U.C.I. Bulletin 203.

An illustrated, informative bulletin, **"How Wheelabrating Has Replaced Acid Pickling"** published by American Wheelabrator & Equipment Corp., Mishawaka, Indiana, describes how Wheelabrator airless blast cleaning equipment offers many advantages that makes it an effective metal cleaning process.

Included in this descriptive booklet, designated as Bulletin No. 584, are numerous case history studies which relate the advantages obtained by prominent concerns in replacing their acid pickling process with Wheelabrator equipment. Among those shown are forge plants, enameling shops, job plating concerns and a manufacturer of steel pipe and tubing.

Finish Booklet. O'Neil Duro, Milwaukee 1, Wisconsin, has issued a new 16-page booklet entitled, "O'NEIL DURO—creating beauty through better finishes for industry." The booklet, of 10 x 10-inch size with attractive 4-color cover, gives a brief history of the company and describes the enamels and lacquers the firm manufactures and their uses.

Condensed Catalog 292 of the Bryant Industrial Division (Affiliated Gas Equipment, Inc.), 1020 London Road, Cleveland 10, Ohio, describes and pictures thirty-three items of gas combustion equipment.

Capacity and dimensional tables are included for combustion assemblies, gas-air and air-gas mixers, blowers and boosters, many burners types, pilot and ignition devices, controls, valves, regulators and other accessories.

S-B Process for Zinc Plating. Complete technical instructions for using this process are included in an eight-page illustrated bulletin available from the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

Platecoil, a lightweight embossed plate for tank heating, is discussed as to installation, operation, features, and advantages in a bulletin released by the Kold-Hold Manufacturing Co., Lansing 4, Michigan.

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ASTM Viscosity Cups, Conical Mandrel ASTM D522-41, Abrasiometer ASTM D658-44, Scratch Adhesion & Mar Tester (Laboratory & Pocket type), Automatic Spraying Machine D825-45T, Bell Tele. Lab. Impact Tester, Dust Free Tester (drying time).

Write for illustrated literature.

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Alfco Fire-Guns, now tin-plated by a new process for corrosion resistance throughout, are the subject of a leaflet issued by the American-LaFrance-Foamite Corp., Elmira, New York.

Wheelco Bulletin AC-1 and Price Lists, prepared by the Wheelco Instruments Co., Harrison & Peoria Sts., Chicago 7, Ill., describe the new line of Wheelco a.c. and d.c. measuring, indicating, signaling, and recording instruments.

Ceilcote Resin Cement, which is acid, alkali, and solvent-proof and recommend as an excellent bonding mortar for difficult operations, is discussed fully in a bulletin available from The Ceilcote Co., Rockefeller Bldg., Cleveland, Ohio.

Materials of Construction. Materials of construction and packing materials for use with over 300 industrial liquids and gases are listed in the new and revised Catalog Section 97, published by the Fischer & Porter Co., 97 County Line Rd., Hatboro, Pa. This tabulation of corrosion-resistant materials is based on previously published data, together with the company's experience in handling corrosive fluids.

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Acme Bulletin 92. The Acme Equipment Co., Inc., 1126 S. Clinton St., Chicago 6, Ill., has available a 28-page illustrated bulletin listing the availability of hundreds of war surplus items, such as fire extinguishers, lift trucks, hoists, production machinery and equipment, and so on.

"Mahon Industrial Equipment," a 12-page booklet prepared by The R. C. Mahon Co., Detroit 11, Mich., describes and pictures complete finishing systems for enamel, lacquer, paint and varnish; spray pickling equipment, metal cleaning and rust-proofing equipment, dry-off ovens, filtered air supply systems, hydrofilter spray booths, drying and baking ovens, core ovens, dust collecting systems, and numerous other units of special production equipment.

Bristol Bulletin No. 6620. A bulletin on the company's new Series 500 Absolute Pressure Gage has just been published by The Bristol Company, 108 Bristol Rd., Waterbury 91, Conn. The bulletin describes the instrument and offers data on the new principle of operation employed, which maks it possible to accurately record and automatically control absolute pressure within a scale range as low as zero to 29 millimeters of mercury absolute.

Belke Utility Plating Racks. A four-page illustrated bulletin, prepared by the Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Ill., provides complete information on the five models of Belke Utility Racks, which are claimed by the manufacturer to efficiently handle 90 per cent of all plating jobs, including bright nickel and chrome. Bulletin 980 also shows the improvements in rack flexibility made possible by the use of the new Vac-Seal Removable Tip Assemblies.

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FRESH SUPPLY AVAILABLE
KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

Flex-Abrasive Multi-Bands, Wheels-Cones, and Micro-Points are the subject of a leaflet prepared by The Flex-Abrasive Co., 108 West Lake St., Chicago 1, Illinois.

Diversey No. 519, a dry powdered product completely and readily soluble in water and designed for use in spray washing machines, is the subject of a data sheet issued by The Diversey Corp., 53 W. Jackson Blvd., Chicago 4, Illinois.

Unichrome Dip Bulletin 11. Instructions outlining a simple dipping process for producing yellow or olive drab coatings on zinc plate are contained in this bulletin available from United Chromium, Incorporated, 51 E. 42nd St., New York 17, New York.

"Summer Complaints Vanish With A Breeze" is the title of a four-page leaflet prepared by the Elliott Manufacturing Co., 350 State St., Dept. F, Binghamton, N. Y., which provides complete specifications of the Elliott 24-inch industrial fan. Prices are included.

Hercules Synthetic Resins and Solution Charts. The Hercules Powder Co., Wilmington 99, Del., has prepared two charts, 8½ x 11 inches, which provide information on the trade names of its resins, brief chemical descriptions, and typical test data, such as acid number, color, softening point, and viscosity ratings.

A new attachment for measuring the abrasion resistance of paints, varnishes, lacquers, linoleum, and other products, the **Gardner Model 105 Washability and Abrasion Machine,** is illustrated and described in a six-page leaflet available from Henry A. Gardner Laboratory, Inc., Bethesda 14, Md. Also shown and discussed is the Special Model 105 Machine with explosion proof motor and switch designed for determining the ease of rubbing finishes in the presence of volatile rubbing compounds.

Totrust, a combined rust-inhibitive paint primer and finish coat, is fully covered in a six-page pocket-size folder issued by The Wilbur & Williams Co., Boston 15, Massachusetts.

Sly "Purair" Helmet for sand and grit blasting, weighing only 5½ lb., is the subject of **Bulletin No. 97** issued by The W. W. Sly Manufacturing Co., 4700 Train Ave., Cleveland 2, Ohio. Complete description and instructions for use are furnished.

Standard Samples Issued or in Preparation by the National Bureau of Standards (Supplement to National Bureau of Standards Circular 398), available from the Publications Section, National Bureau of Standards, Washington 25, D. C., consists of a descriptive listing of the various Standard Samples issued, a schedule of weights and fees, and directions for ordering. Summarized tables of analyses are presented to indicate the standards presently available.

Lima Gearshift Drives. The Lima Electric Motor Co., Lima, Ohio, has announced the release of its Bulletin DB-1 which describes in detail Lima Gearshift Drives for selective speed machine operations; electric motors and pedestal grinders; buffing and polishing lathes. Fully illustrated, the bulletin contains complete type and gear ratio information on the Lima Drives and frame sizes and styles of electric motors. It also contains specific information on pedestal grinders and buffing and polishing lathes.

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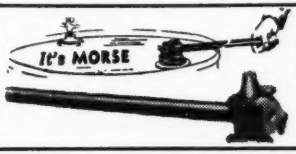

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The Finishing Touch

By J. A. Patterson

"Bill needs a vacation—all he can think about is formulas."

Opportunity Section

FOR SALE: 2,500 Safety Needle Point Tampico wheels. Never used, excellent for satinizing work on metal. 12" diameter, 1¼" hole, 20% off present market price. Ford Metal Moulding Co., 27-01 Bridge Plaza N., Long Island City, N. Y.

FOR SALE: Direct gas fired drying oven, 14' x 25' x 7'9", complete with 600,000 BTU 1-hr. burner and controls. New in 1946, used one year. Perfect for drying porcelain or baking paint. Crated for shipment, $1,500.00. Write Seeger Refrigerator Co., 850 Arcade Street, St. Paul 6, Minnesota.

SALESMAN WANTED

Well-known firm manufacturing "Plating Racks," requires men to contact Plating and Metal Finishing Industry. Sales and industrial experience necessary. Straight commission. No objection to non-competing lines. Reply in confidence, giving age, experience, business details and lines now handled. Write Box No. 83, c/o PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio.

FOR SALE: 2 Binks dry type Spray Booths—10' wide, 7' high, 6' working depth, 8'5" overall. 2 24-2 exhaust fans equipped with 2 HP open type BB 220V 60C 3 phase. 2 24" dia. exhaust stacks with access door. 2 24" dia. weather canopies. 2 manual dampers. 2 200 watt angle type reflectors —never used and in perfect condition.

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Paasche unit, comprising automatic spray guns, 4-foot wide water curtain booth; 26 rotating spindle carrying units; complete set infra-red drying lamps; two-stage air compressor, air receiver, all necessary motors, tanks, hose, gauges, fittings, etc.

This is a complete set-up for automatically spray coating five gallon square cans on all exterior surfaces at rate of 20 a minute. Should be easily adapted to spray coat many other articles.

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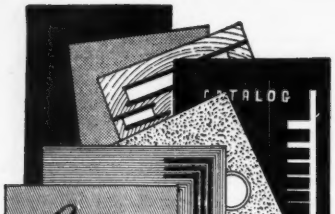

Catalogs

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Instruments
"Specification Index for Bristol Instruments" is the title of a bulletin published by The Bristol Co., Waterbury 91, Conn. Designated as No. W1800, the bulletin contains illustrated data on the Bristol line of automatic controlling, recording, and indicating instruments.

2. Non-Ferrous Alloys
The Seymour Manufacturing Co., Seymour, Conn., has issued catalogs describing specifications, properties, and characteristics of Seymour Nickel Silver Alloys and Phosphor Bronze Alloys.

3. Black Finishes
A "Black Book" describing details of Zinc Black and other Black-Magic metal finishes has been published by the Mitchell-Bradford Chemical Co., Stratford, Bridgeport, Connecticut.

4. Electrostatic Spray Painting
A booklet entitled "Ransburg Coating Processes" describing electrostatic spray painting has been issued by Harper J. Ransburg Co., Indianapolis 7, Indiana.

5. Emulsion Cleaner
Mul Emulsion Cleaner is described in a folder issued by The DuBois Co., Cincinnati 3, Ohio, in which properties and suggested uses of the product are outlined.

6. Backstand Belts
"Facts About Backstand-Belt Grinding and Polishing" are enumerated in a booklet being distributed by Armour & Co., Chicago 9, Illinois.

7. Aluminum Finishes
A 64-page manual entitled "Finishes for Alcoa Aluminum" is available from the Aluminum Company of America, Pittsburgh 19, Pennsylvania.

8. Centrifugal Dryer
The New Holland Machine Co., New Holland, Pa., has published a bulletin providing complete specifications of the New Holland Kreider Centrifugal Dryer and describing typical installations.

9. Infra-Red Brochure
The Fostoria Pressed Steel Corp., Fostoria, Ohio, has published Brochure EV-1146 which illustrates and describes the use of the Fostoria Evenray System in industrial heating applications.

10. Industrial Wire Cloth and Screens
K-P Catalog No. 36, issued by Korb-Pettit Wire Fabrics and Iron Works, Inc., Philadelphia 22, Pa., describes by means of illustrations and data tables the many types of industrial wire cloth and woven wire screens manufactured by the company.

11. Gold Plating
An instruction booklet describing gold coloring solutions for various shades of gold is now being issued by Baker & Co., Inc., Newark, New Jersey.

12. Duranite H Folder
A folder outlining field results and laboratory tests made on its new organic finish, Duranite H, and extending over a two-year period is available from the Industrial Finishes Dept., Atlas Powder Co., Wilmington 99, Delaware.

13. General Purpose Fans
"General Purpose Fans" is the title of an eight-page bulletin designated as Bulletin 481 distributed by the New York Blower Co., Chicago 16, Illinois.

14. Flock Color Card
A color card containing samples of flock finishes has been issued by the Rayon Processing Company of Rhode Island, Inc., Central Falls, Rhode Island.

15. Metal Lacquers
"Is There A Better Metal Finish Than The One You Now Use?" is a booklet issued by The Egyptian Lacquer Mfg. Co., Newark, N. J., describing six clear lacquers for metal.

16. Chemifinishes
General information concerning the finishing of metals with Du-Lite materials is contained in literature prepared by The Du-Lite Chemical Corp., Middletown, Connecticut.

17. Electric Radiant Heaters
The Edwin L. Wiegand Co., Pittsburgh 8, Pa., has available Bulletin CS-603 which describes the construction of Chromalox heaters and lists the uses, operating characteristics, and advantages of the infra-red units.

18. Temperature Controls
Self-operated temperature controls for plating and finishing applications are described in Catalog No. 650 available from the Sarco Co., Inc., New York 1, New York.

19. Deburring and Finishing Equipment
"Cut Labor Costs ½ or More" is the title of a bulletin issued by Almco, Division of Queen Stove Works, Inc., Albert Lea, Minn., describing the complete line of Supersheen deburring and finishing barrels, equipment, and supplies.

20. Striplastic No. 320
A bulletin describing the properties and applications of Striplastic No. 320 is available from the Striplastic Co., Cleveland 6, Ohio.

21. Cleaning Emulsion
"Minit-Kote," a cleaning emulsion for preparing metal surfaces for painting, is fully described in a four-page two-color illustrated folder prepared by Klem Chemicals, Inc., Dearborn, Michigan.

22. Descaling Process
The Bullard-Dunn Process of electrochemical descaling of ferrous metals is described in detail in a bulletin available from the Bullard-Dunn Process Division, The Bullard Co., Bridgeport 2, Conn.

23. Finishing Equipment
The Despatch Oven Co., Minneapolis 14, Minn., has prepared Bulletin C-51 which illustrates and describes its complete line of gas-oil, electric, and steam finishing equipment.

24. Zinc and Cadmium Dip
"Iridite," a quick dip process for improving corrosion resistance or as a paint base or final finish on all zinc or cadmium surfaces, is described in a four-page folder published by Allied Research Products, Inc., Baltimore 5, Maryland.

25. Demineralizers
Filt-R-Stil Demineralizers designed to deliver the low cost chemical equivalent of distilled water are illustrated and described in a booklet issued by the Ion Exchange Products Dept., American Cyanamid Co., New York 20, New York.

26. Plating Barrel
Facts concerning the construction and operation of the new King Hardwood Plating Barrel are presented in a folder available from King's Hardwood Plating Barrels, Dayton 3, Ohio.

27. Abrasive Grain
The Simonds Abrasive Co., Philadelphia 37, Pa., is issuing an illustrated data sheet on "Borolon" Aluminum Oxide Abrasive Grain for the polishing trade and general industrial uses.

28. Activated Carbon
The use of activated carbon for decolorizing, purifying, and deodorizing various liquids and electroplating solutions is described in literature available from the Darco Corp., New York 17, New York.

29. Spray Equipment
Catalog 86, illustrating and describing its line of low pressure spray guns, automatic spray guns, nozzles and tips, spray gun accessories, pressure tanks and control heads, portable painting units, stationary compressors, and Pneumix air-motored agitators, is available from the Eclipse Air Brush Co., Newark 7, New Jersey.

30. Boothcote Circular
A circular describing the use of Boothcote, a spray booth coating, is available from the Hygrade Food Products Corp., Boothcote Division, Buffalo 6, New York.

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